The Dissertation Committee for Amy Gill Langenkamp
certifies that this is the approved version of the following dissertation:

**Following Different Pathways: Effects of Social Relationships and**

**Social Opportunity on Students' Academic Trajectory After School Transitions**

Committee:

Chandra Muller, Supervisor

Robert Crosnoe

John Mirowsky

R. Kelly Raley

Kathryn S. Schiller

# Following Different Pathways: Effects of Social Relationships and Social Opportunity on Students' Academic Trajectory After School Transitions

by

**Amy Gill Langenkamp, B.A.; M.A.**

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## Dedication

This dissertation is dedicated to the all the outcasts of the educational system. They too often fade into the background because they have no advocates—or they have trouble finding a place where they belong. It is for them that I entered graduate school; it is they who fuel my sociological imagination

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A central component of transitions is that their effect depends upon the context with which they occur. Graduate school has been quite a transition, and one which occurred during my own transition to adulthood and a journey with an interesting and inspiring cast of characters. It has been my privilege to come across these people during my journey through graduate school.

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**Following Different Pathways: Effects of Social Relationships and Social Opportunity on Students' Academic Trajectory After School Transitions**

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This study investigates student school transitions during adolescence, and how the maintenance and disruption of social ties during this school change affects students' academic trajectory through high school. School transitions are a compulsory part of the American system of education and are characterized as the movement of students between schools. Students follow these institutional pathways when they change schools, and which pathway followed plays a role in how they adjust to the new school.

Some transitions are normative and are a part of the organization of schools, such as the transition from middle to high school. Some involve deviation from the traditional path, such as transferring during high school. In either case, transitions interrupt students' academic trajectory through school and involve a transformation of school-based social relationships that affect academic success. Effects of transitions have been under-conceptualized in current empirical research, particularly with regard to the nonacademic realm of schools. This dissertation extends research on school transitions by broadening

our understanding of how student movement between institutions affects their academic trajectory and how this is linked to three crucial aspects of student transitions: institutional pathway, social relationships made in schools and the opportunity for new social ties at the receiving school.

Results reinforce that both affective attachment and extracurricular involvement are related to students overall academic trajectory. This is the case even after those ties are disrupted and reconfigured by changing schools. Results also suggest that social opportunity at the receiving institution is protective against low academic outcomes in the transition to high school, particularly among students who are socially and academically disengaged in middle school. Finally, results point to similarities among students who follow divergent institutional pathways, either in the transition to high school or for those who transfer during high school. Specifically, these students fare better after a school change by the end of high school, net of where they started academically, if they are disengaged from the sending school.

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Schools are institutions in which young people spend most of their time in their formative years; it is the place where adolescents explore the social and academic roles that impact their future adult selves. While students' academic trajectory during these years has continually shown to impact later life socioeconomic status (Sewell, Haller, and Ohlendorf 1970), health (Ross and Mirowsky 1999) and integration into society (Bourdieu and Passeron 1990), it is within the walls of middle school and high school that reputations are made and broken, and the focus of life is often more social than academic. As David Sedaris, a cultural essayist, remarks in a recent book, the popular crowd of his adolescence was worshipped in such a way that "we studied their lives the way we were supposed to study math and English" and where everyone wanted to be a part of the "in" crowd. Individual attributes were unimportant. Rather, "the group would *make* you special. That was its magic" (Sedaris 2004).

It is no surprise that social relationships made within school impact adjustment, integration and even academic achievement (Libbey 2004; Coleman 1987). But most paths through school require leaving one school and transitioning to another. After a school change, social relationships are reconfigured and social status is reordered. In the transition to high school, popular kids from one middle school converge with popular kids from another school; all are trying to fit into the larger social climate of the high school. Socially speaking, perhaps one of the most intriguing aspects of high schools is that social climates are *not* uniform (Coleman 1961; Crosnoe, Muller, and Frank 2004). Jocks may be the most valuable commodity at one school while the "drama nerds" are

idolized at another. Therefore, not only do individuals have to navigate the transformation of social ties when they enter a new school, they must identify and negotiate where they will fit into the social milieu in their new school.

### 1.1 Research Problem

Adolescence is a time of transition during the life course—one such change is navigating transitions between institutions where youth spend a majority of their time: school. The educational system is one of the largest socializing forces in the lives of youth; success in this institution is a key factor to social mobility and future life opportunity. Most students must negotiate transitions between schools as a part of their path through this system. Some transitions are normative and are a part of the organization of schools, such as the transition from middle to high school. Some involve deviation from the traditional path, such as transferring during high school. In either case, transitions interrupt students' academic trajectory through school and involve a transformation of school-based social relationships that affect academic success.

Investigating the point of school change provides a window of insight into mechanisms by which students maintain and reconfigure social relationships as the formal organization of their school changes—and the effect this has on students' educational trajectory. Effects of transitions have been under-conceptualized in current empirical research, particularly with regard to the nonacademic realm of schools. This dissertation extends research on school transitions by broadening our understanding of how student movement between institutions affects their academic trajectory and how this is linked to three crucial aspects of student transitions: institutional pathway, social

relationships made in schools and the opportunity for new social ties at the receiving school.

Changing schools is not an individual event; not only do the majority of students move through school along established pathways—those who diverge and enter a new school alone are still moving between two institutions. Therefore, school transitions can be considered institutional pathways, some of which involve cohorts of students transitioning together and some where students diverge from the traditional pathway. The institutional pathway is more well-defined in the transition to high school, where students commonly follow a particular feeder pattern and groups of students enter the same high school together. The pathway followed by students as they transition to high school has been found to affect academic adjustment upon entering high school (Schiller 1999), where social status helps those transitioning with classmates. Other paths followed by students are more divergent, such as a middle school student transitioning to a magnet high school without classmates. The two pathways described above have distinct meaning for informal processes such as social relationships and social opportunities. However, they are similar in the sense that they are both characterized by a school change which follows the structural pattern of the system of education in the United States. From an educational and organizational perspective, a known transition such as the one to high school likely involves a more deliberate protocol for handling orientation and course placement and may therefore be an easier change for individual students.

The transition to high school is one of the last compulsory transitions made by practically all people in our society. An important mechanism of this school transition is

the sorting of individuals socially and academically. Social relationships built in school are reconfigured or disrupted. Students are placed in courses and their permanent academic record begins. The importance of school transitions is magnified by two aspects of this school change. First, it occurs during the developmental stage of adolescence. Not only are students' social ties changing as the school changes, individuals are becoming more independent from their family and more active participants in the creation and maintenance of their social relationships both inside and outside the social system of their school. Second, while choice plays a role in the creation of new social ties, it also is a core component of school transitions. The transition to high school is a point in time when individuals may exercise choice within an institutionally structured set of opportunities. While this exercise of choice may only occur in circumstances where they have the opportunity for choice, agency is an additional factor that may impact how transitions affect academic outcomes and later transition to adulthood.

Therefore, the point of school change—particularly the transition to high school—gives insight into individual's broader life trajectory and sheds light on an intermediate step in people's paths through the life course. This study investigates social processes that surround the sorting of adolescents as they progress through the educational system, develop, and earn independence. In some respects this can be considered a turning point for people at a crucial developmental stage, where the choices made and social processes that occur lay the groundwork for future individual opportunity. Furthermore, it allows researchers the ability to understand systemic ways in which opportunity may be provided, and vulnerability may be avoided.

Other school transitions during adolescence, such as transferring during high school, occur *outside* of the structural pattern of schooling in the United States. Making this type of school change implies a different set of issues, as transfer students enter their new school as the only new student. In other words, elements of disrupting social relationships and individual agency are even more dramatic.

In this dissertation, I conceptualize school transitions as institutional pathways, which mirror both the type of transition students make and the implication of social relationships during this school change. Conceptualization of these pathways emerged from research and theory regarding the impact of school transitions and their academic and social consequences on students' educational trajectory. When considered institutional pathways, school transitions are not only individual experiences, but also part of the systemic way that schools organize students. In addition, institutional pathways capture elements about the disruption of social relationships and opportunity for new social ties as students change schools. For example, a collective pathway is one that students transition within the structural pattern of schooling *and* do so with many classmates from their previous school. Divergent pathways may follow the structural pattern of schooling or they may not, but they are more solitary because they involve disruption of social relationships to a greater extent.

While research on education addresses curricular consistency and consequences involved in changing schools, the importance of social relationships are largely overlooked. Yet social relationships have shown to be a major resource, particularly in confined social systems such as schools. These beneficial social ties are referred to as

"social capital." Social capital affects individuals' integration in schools, which can contribute to higher academic achievement (Coleman 1987), or hinder progress for those with low academic standing (Schiller 1999). Social relationships are developmentally important for security, support and acceptance—but they can also provide access to resources that translate into higher academic achievement and attainment. This dissertation is built on the notion that social relationships are essential to successfully navigating social institutions and formal organizations throughout our education and later in life. However, what role do social relationships play when students change schools and these ties are severed or reconfigured? This question is largely overlooked in psychological research on school transitions (see Eccles, Lord, and Midgley 1991; Midgley, Feldlaufer, and Eccles 1989b for exceptions). I address the consequences of the transformation of social relationships and explore whether the disruption of social relationships provides opportunities or, alternatively, exacerbates students' vulnerabilities.

Finally, because school transitions involve moving between two institutions, the opportunity to create new social ties at the receiving school is an important consideration for effects of transition on students' academic trajectory. Schools can be thought of as social systems, each with a particular social organization involving social norms with recognized status amongst students (Coleman 1996). Part of the challenge for students changing schools is having their social system shift. This involves negotiating their new school's social climate and figuring out a way to fit into it. The ability to successfully integrate into the social organization of their new school also affects adolescents'

academic trajectory through the school (Brown 1990). Therefore, a key element of transitions as institutional pathways involves consideration of the opportunity to create new social ties at the receiving schools. This is particularly important when considering that some students may benefit from institutional pathways where they remove themselves from the middle school social system and transition to a place with lots of social opportunity—where their status can be reestablished and their identity transformed.

### 1.2 Research Questions

This dissertation investigates how the disruption and reconfiguration of social ties during school transitions affects academic trajectories of students in adolescence and addresses the following research questions:

1. What pathways do youth follow when they transition to high school? How does the reconfiguration of social relationships of each transition affect academic adjustment and course placement in the first year of high school?
2. When youth follow collective pathways, does this protect them against failure and/or low course placement—or does this only apply to those with high status amongst peers? What role does social opportunity at the new school play for protecting or exacerbating student vulnerability to failure?
3. How vulnerable are students who follow divergent pathways, without social ties from previous classmates? Do transfer students have an additional disadvantage because they change schools outside the institutionalized structure of schooling?

## THEORETICAL BACKGROUND

Changing schools can be a catalyst for individual students, both positively and negatively. For example, if a student is unhappy at school, a transfer could be a chance for them to make a fresh start in a new environment. The new school might provide them the opportunity to escape academic failure. Perhaps the new school gives students a chance to get away from negative peer influences. In other words, the types of transitions made during adolescence should not be considered monolithic—and neither should the responses and consequences that individuals have to changing schools.

In this section, I review research on school transitions and draw on an interdisciplinary literature to compare/contrast types of school change and conceptualize these changes as institutional pathways. This includes an exploration of ways that heterogeneity in response to school transitions may occur among students. Finally, I develop two important mechanisms at play during school transitions, social relationships made in schools and the opportunity for new social ties at the receiving school. Selection into school transitions is also discussed.

### 1.3 School Transitions

School transitions are a part of everyone's journey through the educational system in the United States—though people are inevitably affected by these transitions differently. This study considers two transitions that occur during adolescence and how these school changes may alter students' educational trajectory. First, the transition from middle school to high school occurs for 89% of all students (Myers, Heiser, and Wu 1995) and has been called a normative transition, considered as much a part of

adolescence as pubertal changes (Barber and Olsen 2004). Second, students who transfer during high school follow a less normative path (ERIC Clearinghouse on Urban Education 1991) because they are leaving the institution for reasons other than graduation.

An interdisciplinary literature addresses consequences of school transitions. Education research typically considers school transitions from the perspective of curriculum continuity characterized by vertical teaming and course placement while psychological research casts the consequences of school change as most relevant in the developmental and ecological arenas. On the one hand, education research focuses on organizational components of school transitions and ways to most effectively process students. On the other, social and developmental psychology introduce the role of school context into the effects of school transitions. In this study, I extend research on school transitions by using components from both perspectives and conceptualize transitions as institutional pathways. Here students follow pathways where both the individual and the school play a role in their consequences. I incorporate sociological considerations of disruption in schooling, which focus on the most mobile population: economically disadvantaged students and race and ethnic minorities.

A note about terminology: in this dissertation, terms such as “school transition” or “school change” will be used to denote the general experience of changing schools and are meant to encompass both the transition to high school as well as high school transfers. The latter terms will be used when a more specific type of school transition is being discussed.

*1.3.1 The Structure of Schooling*

The first step in the investigation of how school transitions might affect students involves understanding the manner that schools are organized. This also aids in making distinctions between the transition to high school and high school transfers. Schooling in the United States is structured such that each grade represents, theoretically, an increase in increments of knowledge across core subjects. While exact structures vary by district, most school systems are organized such that students enter school at the same age and matriculate to middle school, and then to high school, at the same time. The transition to high school is characterized by a shift in the institutional environment that, in most cases, is less personalized and involves new expectations such as graduation requirements, cumulative achievement and class rank—all of which impact entrance into postsecondary education and employment opportunities (Reyes, Gillock, and Kobus 1994). This shift and intensification of academic expectations often prompts schools to establish a formal orientation program for new students.

This structure, therefore, distinguishes the transition to high school from high school transfers. Because the transition to high school occurs at the same time for most students, cohorts of students enter high school together. Socially speaking, these students are "in the same boat," where a camaraderie can develop among students navigating this new institutional environment collectively. The high school transfer, alternatively, is a much more solitary school change.[1] Institutional options for students to change schools

[1] When making these distinctions, it is important to remember that where students attend school is not random and is highly related to residential patterns. Likewise, when and why students change schools is often a reflection of agency on the part of the student and their parents. Therefore, selection bias is

following less traditional pathways remain plentiful. While desegregation efforts such as bussing students from one district to another is waning (Pride and May 1999), choice initiatives allowing magnet school and charter school attendance have, in recent decades, grown in popularity (Archbald 2004; Langenkamp 2007). Research on the national level reflects this, finding that an increasing proportion of students who transfer during high school do so without changes residences (Swanson and Schneider 1999).

At the same time, school reforms over the past few decades have focused on formalizing curricular planning between grade levels (Morse 1997), where skills are taught sequentially and build on prior coursework. Often coined "vertical teaming," targeted curricular goals across grade levels are commonly considered advantageous within schools (McGoogan 2002; Gewetz and Paul 2005) and districts (Kowal 2002). In the more recent educational policy climate that stresses accountability, vertical teaming is thought to be most advantageous to at-risk students and has been connected with issues involving the opportunity to learn (Anderson 2005; Blankstein and Cocozzella 2004). Therefore, when present within districts, this type of academic organization formally influences what is taught even across different *levels* of schooling, such as middle school and high school. Vertical teaming advocates suggest that middle school teachers should informally influence course placement decisions at the high school (Kowal 2002). This is certainly a rational suggestion from an organizational perspective. However, some evidence suggests that negative academic labels can hinder students' ability to adjust

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introduced when making these distinctions and must be considered. I address this issue in more detail below as well as methodologically throughout this study.

academically to their new school (Schiller 1999) and can be particularly problematic for students with disciplinary problems (Bowditch 1993). In sum, while vertical teaming and the resulting curricular alignment are effective organizational strategies, their effect on individual students, particularly those marginalized or negatively labeled by schools, are typically not considered. Other fields of research on school change do address the overall context of school transitions and how these transitions may differentially affect those most marginalized in schools.

*1.3.2. Ecological Transitions and Psychological Consequences*

From a more psychological perspective, school transitions are conceptualized as ecological transitions (Bronfenbrenner 1979), which involve a change in students' school environment and a shift in their role within that environment. Many researchers have used Bronfenbrenner's (1979) conceptualization of ecological transitions as an essential component of school transitions. As students move to a new school, their environment changes in fundamental ways (La Paro, Pianta, and Cox 2000) (Gillock and Reyes 1996; Seidman and French 2004); informal norms must be learned, social status fluctuates, and new academic expectations must be met.

In addition, both the transition to high school and high school transfers occur during the period of adolescence. This is often treated as a vulnerable stage in the life course due to a confluence of changes such as pubertal and cognitive development, processes of developing identity and social reasoning, and an increased independence from family and reliance on peers for social support and acceptance (Seidman and French 2004; Eccles 1999). While debates about whether adolescence is a period of "storm and

stress" have continued for decades (see Elkin and Westley 1955; Eccles et al. 1993 for example), it is undoubtedly a time of social and developmental change for individuals.

Finally, even though the transition to high school is considered a normative transition, all school transitions are conceptualized as disruptive (Gillock and Reyes 1996; Reyes, Gillock, Kobus, and Sanchez 2000; Pribesh and Downey 1999). Typically, this disruption is considered to have a negative impact on students (ERIC Clearinghouse on Urban Education 1991; Eccles et al. 1991), but not always (Kinney 1993; Swanson and Schneider 1999).

*1.3.3 Vulnerability and Opportunity during School Transitions*

The two strands of research discussed above both contribute reasons why sociologists would expect certain students to be more vulnerable to school mobility. First, if vertical teaming does promote opportunity to learn, it is not seen as feasible on a large scale (Rutheford and Boehm 2004). Therefore, the most vulnerable students—traditionally those following a divergent pathway—do not benefit from vertical teaming. Empirical research has yet to investigate this possibility, as sociological research would suggest that certain students would benefit from less cohesion when that cohesion carries with it negative aspects such as discrimination and labeling. In addition, while high school course taking records are generally compatible across schools within the United States, some research suggests less institutional communication between schools when students follow a less traditional path (Jason et al. 1992). Second, the disruptive nature of transitions on individual students may be more dramatic for those with less residential, economic and/or familial stability.

From a sociological perspective, stratification in the education system mirrors that of society (Coleman 1961; Collins 1979). Gender and race/ethnic differences in academic performance have long been considered systemic (Ainsworth-Darnell and Downey 1998; Sadker and Sadker 1994) and confounded with socioeconomic status (Bankston and Caldas 1997; Lareau 1989). During school transitions, these groups are often viewed as having an additional vulnerability (see Alexander, Entwisle, and Dauber 1996; Seidman, Allen, Aber, Mitchell, and Feinman 1994 for example).

In the transition to high school, the Adolescent Pathways Project focused specifically on the impact of ecological transitions for urban, minority populations (Seidman et al. 1994), concluding that minority adolescents needed higher levels of social support from peers and teachers in order to successfully navigate the transition to high school (Seidman and French 2004; Seidman et al. 1994). Other research focusing on minority youth resilience reach similar conclusions (Catterall 1998; Reyes et al. 1994; Roderick 2003). In addition, parental involvement has also been shown to help students academically with the transition to high school (Baker and Stevenson 1986). Part of the reason that many avenues of support are effective is a result of vulnerability: students already marginalized in the school system report having particular difficulty navigating the terrain of their new high school because of the severing of important social ties at their old school, such as teachers (Reyes et al. 1994; Hirsch and Rapkin 1987; Newman, Lohman, Newman, Myers, and Smith 2000). Gender differences in the reaction to the transition to high school have been found as well (Roderick 2003; Simmons and Blyth

1987), which are most often connected to students' social relationships (Wigfield, Eccles, Mac Iver, Reuman, and Midgley 1991).

Transfer students are also considered vulnerable, but their at-risk status stems from the non-normative character of this type of school change and its more frequent occurrence among some sociodemographic populations (ERIC Clearinghouse on Urban Education 1991). When a student transfers between schools, the change occurs for reasons other than graduation. Traditionally, research finds that school mobility is a result of instability originating from economic disadvantage, family structure transitions and residential mobility (Ream 2003; Astone and McLanahan 1994; Alexander et al. 1996). However, changing schools can also be considered a result of school choice (Plank, Schiller, Schneider, and Coleman 1993), which has increased in recent decades (Langenkamp 2007). In addition, as the public school places increased emphasis on high-stakes standardized testing (Department of Education 2002), evidence suggests that students exhibiting problem behavior and even, in some cases, low achievement are being pushed out of schools through means of a disciplinary transfer (Fleming, Harachi, Catalano, Haggerty, and Abbott 2001; Bowditch 1993).

In research cited above, vulnerability is often linked to students' ascriptive characteristics such as gender or racial and ethnic identity. However, vulnerability may also interact with individual student attachment to their school and the opportunity to make new social ties in high school, particularly during school transitions.

Vulnerability during school transitions can be connected back to the metaphor of ecological transitions. As the school environment changes and is disrupted, certain

students may adapt in the new environment more effectively than others. While school transitions may be the movement of students between two "ecological contexts"—these contexts involve individual students' negotiating movement between two institutions. This movement, in turn, creates institutional pathways. In other words, the manner in which schools process students is important to consider, but so is the individual reaction to this "processing." In addition, research focusing on student vulnerability recognizes that students often have options when faced with changing school (e.g., residential location, magnet schools, etc.) and those students from certain sociodemographic populations may be less likely to choose some pathways and may be more vulnerable to following other pathways.

While much research has focused on which students are vulnerable during school transitions, there is also possibility that school transitions offer the opposite—an opportunity to start fresh in a new school. Academically, this is particularly the case for the transition to high school, as students' permanent academic record largely begins at this time. Generally speaking, opportunity during school change centers around individual agency on the part of the student, on the one hand, and the disruption of social ties, on the other. These are both discussed below as components of conceptualizing transitions as institutional pathways.

### 1.4 School Transitions as Institutional Pathways

To fully consider the impact of school transitions, elements from fields of education, psychology and sociology must be included. The movement of individuals between institutions has implications on developmental processes due to these changes

occurring during adolescence. Educational processes are involved as well, as curricular consistency or inconsistency comes into play. Finally, the way students are sorted in the system of education, and the pathways they follow throughout their educational trajectory, are often reflective of processes of stratification. All of these factors are related to the selection of who attends what school, and when and why they transition to certain schools. Viewing school transitions as institutional pathways addresses elements of endogeneity by embedding the factors mentioned above into the institutionalized construction of pathways/of opportunities that students follow. In addition, the maintenance, disruption and reconfiguration of social ties are crucial considerations in the impact of school transitions (Aikins, Bierman, and Parker 2005; Berndt, Hawkins, and Jiao 1999; Kinney 1993; Pribesh and Downey 1999; Hagan, MacMillan, and Wheaton 1996), and these are a central component to institutional pathways followed by students.

### *1.4.1 Collective Pathways*

In the transition to high school, most middle school students enter high school by transitioning with a cohort of classmates from their middle school. In these cases, the transition to high school is relatively stable in the sense that most of the social relationships from middle school are maintained. This maintenance of social relationships has implications for students entering high school. In general, the relative stability of their institutional pathway to high school signifies that they begin high school with familiar faces in their classes. Whether this stability is a positive or negative experience for the individual depends, in part, on their status in middle school. Partly from previous

research (see Schiller 1999), general expectations are such that students with a high status fare better in a more stable pathway than their lower status classmates.

Previous research has innovatively operationalized the disruption in the transition to high school by analyzing effects of the proportion of students transitioning together from their middle school (Schiller 1999). However, this only reveals one side of the disruption in social relationships, that of the leaving school. Two institutional contexts come into play and so a more complete picture of the amount of disruption involved includes consideration of the receiving school as well as district structure. Size of the district and urbanicity of the school plays a role in the institutional pathway students follow. In more metropolitan areas, there is more choice of where to attend high school than in rural, more geographically isolated areas (Plank et al. 1993). Some high schools receive students from a large number of middle schools while others receive students predominantly from one middle school with a small number of students from other schools. Middle school students transitioning into high school therefore contribute differentially to the make-up of the incoming class, even in "collective" pathways.

*1.4.2 Divergent Pathways*

Not all students follow a collective pathway in the transition to high school. As mentioned above, students may diverge from their middle school classmates. Divergence in the transition to high school could represent another factor of disruption in the adolescents' life, such as a family structure transition and/or a residential move. In addition, this deviation may be a result of agency on the part of the individual such as attending a private school or a school of choice. Another option of divergence in the

transition to high school are situations where a subgroup of students enter the same high school together. Though these students do diverge from the main feeder pattern of their middle school, they do not do so alone. Rather, they disperse to an alternate high school. A dispersed pathway is also expected to be more prevalent in school systems characterized by more choice. In addition, students following this dispersed institutional pathway may attend school in a system with multiple middle schools and high schools resulting in more choice and the lack of a clear, dominant feeder pattern.

Divergence in the transition to high school is in contrast with a transfer. Students who transfer during high school are perhaps more isolated because they change schools outside the customary structure of schooling. In this sense they enter into an institutional environment as an outsider, where there are fewer established supports in place and where there is less communication between institutions regarding policies for course placement. Even though students may be initially more socially isolated after a transfer, the consequences of transferring for individuals may depend largely on the circumstances with which they occur, similar to the divergent institutional pathways in the transition to high school. For example, agency could play a role in all the divergent institutional pathways, where students and their families decide on a school change in order to remove students from possibly damaging reputations and/or a lower social status at the previous school and give them a fresh start in a new institutional context.

### *1.4.3 Effects of School Transitions on Academic Outcomes*

Because students' academic adjustment after a school transition is an

is an excellent indication of successful integration into the new school environment, studies of school transitions in adolescence have most often dealt with consequences of changing schools on academic achievement and attainment (Eccles et al. 1991; Barone, Aguirre-Deandreis, and Trickett 1991; Pribesh and Downey 1999). Students' Grade Point Average (GPA) during the first year of high school is a predictor of both more rigorous course taking as well as cumulative GPA (Stevenson, Schiller, and Schneider 1994). Furthermore, after school transitions, it is an indication of integration into the new school environment and a student's ability to understand teachers' expectations (Schiller 1999). As students transition to high school, it is common for GPA to decline (Barone et al. 1991), although evidence suggests that this decline in academic achievement is temporary for most students not considered at-risk (Roderick 1993).

Academic consequences in the transition to high school vary depending on the feeder pattern followed by middle school students. High achieving middle school students get a boost in GPA when transitioning with more of their classmates, but low achieving middle school students do better when transitioning away from their classmates (Schiller 1999). Thus, the institutional pathway followed by students appears to be linked to students' academic success as they transition to high school, and prior achievement has different meaning depending on the stability of the pathway. In other words, high achievers only benefit when their high status is carried with them by making a stable transition to high school.

Findings of academic consequences for transfer students are somewhat more straightforward. Researchers studying school mobility at all levels of elementary and

secondary education have generally found negative consequences on students' academic attainment and achievement (Hagan et al. 1996). Since this is an unscheduled school change, students can have incorrect academic placement at their new school (ERIC Clearinghouse on Urban Education 1991), or falter due to curriculum variance and/or instructional disruption (Mehana and Reynolds 2004). Bureaucratic issues during school transfer such as acceptance of courses for credit likely apply as well (Bowditch 1993), though no research has investigated this on a large scale.

Coupled with the practical difficulties associated with transferring during high school, transferring schools is often considered a step along a continuum of school disengagement, where dropping out is the final result (Rumberger and Larson 1998). Some studies find that transferring school is associated with later dropout (Swanson and Schneider 1999; Teachman, Paasch, and Carver 1996), though others argue that transferring may actually be protective *against* dropping out of school (Lee and Burkam 1992), giving troubled students a fresh start in a new school.

Academic success and failure—measured as grades earned or courses failed—are excellent indicators for estimating academic adjustment in the new institutional context after a school transition. It allows researchers to gauge student integration into the new school and comprehension of teachers' expectations as well as skills to perform in the classroom, or lack thereof. Academic course placement is also a crucial facet of students' academic trajectory in high school, though less well-vetted in empirical research on transitions. The course placement in the first year of high school sets the stage for the highest course attained, particularly in hierarchical subjects such as math (Schneider,

Swanson, and Riegle-Crumb 1998). More importantly, math course placement in particular is a form of opportunity to learn and an indication of postsecondary attendance. Progression in core high school curricula heavily impacts preparation and acceptance into postsecondary institutions, and Algebra II is a key gatekeeping course (Adelman 1999).

Analyzing both GPA and course taking provide a more complete picture of effects of school transitions for several reasons. They likely tap into different aspects of students' educational trajectory. As mentioned above, GPA is reflective of students' academic adjustment, effort, and engagement in the new institutional environment. Therefore, it can been seen as a reactive element of students' transition to high school, which is why researchers utilize it as an educational outcome of student transitions so often. GPA is also reflective of how the student is evaluated or accepted by the receiving school and the effort put forth by the individual. Course placement is a crucial component of students' opportunity to learn, and is more tied to consistency between institutions. If students pass an Algebra I course in 8$^{th}$ grade, vertical teaming literature would suggest a math course placement of Geometry in 9$^{th}$ grade. This same literature would suggest that consistency is less likely when students follow more divergent pathways in the transition to high school. In the case of students diverging to high school, they may be placed in Algebra I, which is the normative math course placement nationally (Riegle-Crumb 2006; Davenport et al. 1998), despite prior course taking records. Yet placement has also been shown to vary by school (McFarland 2006) as well as be influenced by parents (Baker and Stevenson 1986).

Course placement at the beginning of high school is highly tied to how far students get in their coursework by the end of high school. In addition, due to the clustering of students in schools in Add Health, course placement in comparison to coursemates gives insight into the stratification and amount of rigidity or opportunity available to students within a particular school. Finally, struggling in terms of GPA may be more easily overcome by the end of high school than a low course placement, due to the highly sequential nature of placement. While there's certainly agency in choosing courses—as there is agency in choosing schools—this must be done within a constrained set of options in each case.

This study includes both performance and placement as academic outcomes because they are both likely to vary by institutional pathway followed in the transition to high school, and they provide insight into two related but distinct areas of students' academic progress.

Little is known about the impact of changing schools on students' academic trajectory by the end of high school for all types of school transitions occurring during adolescence. There is some indication that transferring schools early in high school may be beneficial to academic outcomes at the end of high school (Swanson and Schneider 1999). However, much is left to explore concerning the impact of school transitions on academic outcomes. This dissertation focuses on outcomes of academic adjustment of students' after the transition to high school as well as any lasting impact at the end of high school for students following a more divergent pathway. The primary mechanism that

may help or hinder academic adjustment, particularly during school transitions, is social relationships made in schools.

### 1.5 Social Relationships

Social relationships comprise an important context when considering effects of school transitions. Life course research has established that life transitions affect individuals partially due to the context with which they occur (Wheaton 1990). This finding is based on the premise that certain mechanisms are essential to consider in the study of transitions—such as the social context (George 1993). Using this concept as a starting point, I investigate in depth one "social context" of school transitions that have long been considered central mechanisms for researchers of transitions and schools alike: social relationships (Coleman 1987; Schiller 1999; Seidman et al. 1994; Roeser and Eccles 1998; Midgley et al. 1989b).

Social ties made within schools are important psychologically, developmentally and even academically. After a school change, the social world of adolescents is transformed. Particularly for students who diverge from traditional feeder patterns or who transfer, the first friend made in their new school helps to shape their acceptance and integration. Diverging has its consequences, as students entering a new school alone are likely to make friends with more marginal students (Astone and McLanahan 1994). The formation of social ties is a central component of integration into school. Do students feel accepted in their new school? Are they socially isolated within the peer culture of their school? In the glass bowl of youth culture that is the American high school, students are often exceedingly desirous to fit in among their peers. Friendships during adolescence are

a core facet to understanding individual self-concept, since attachment to groups and being liked by peers has been found to be extremely important during adolescence (Cox and Paley 1997; Hartup and Stevens 1997; Coleman 1961; Harter, Whitesell, and Kowalski 1992). Attachment to others within schools is undoubtedly important socially and psychologically (Crosnoe 2000). However, the significance of forming social ties within school and other organizations exceeds social psychological well-being.

### *1.5.1 Social Capital*

An important advance in sociology during the last two decades is the recognition that social relationships are a major social resource, referred to as "social capital." Grounded in a rich history of sociology's emphasis on the benefits of social relationships (Bourdieu 1985; Durkheim 1933), social capital is defined as the use of social relationships as resources. In schools, social relationships and integration into the social networks of schools can contribute to higher academic achievement (Coleman 1987), or hinder progress for those with low academic standing (Schiller 1999) and those marginalized within schools (Bourdieu and Passeron 1990; Stanton-Salazar and Dornbusch 1995).

Part of the reason that social capital is found to be so effective within the environment of schools is that schools are largely self-contained social systems (Coleman 1996; Coleman 1961) where the conditions for creating social capital are met. Social capital is theorized to thrive in communities where there are interpersonal obligations, proper information channels and effective sanctions, and where there is a closure of social networks (see Coleman 1987 for a further explanation). For this reason, research

on schools with a high mobility rate have found less social capital within the school (Nakagawa, Stafford, Fisher, and Matthews 2002), which is a concern for a cohesive and successful organization. In general terms, however, schools are veritable founts of social capital for those poised to take advantage of it and convert it into human capital—or academic achievement and attainment. Given the vulnerability of certain groups in schools and during transitions, social capital has been shown to play an especially critical role in success and integration into school (Stanton-Salazar and Dornbusch 1995; Furstenberg, Cook, Eccles, Elder, and Sameroff 1999).

Initially, one way that social capital was operationalized in empirical research was in situations where it may be lacking, through frequency of residential mobility and number of siblings within a family (Coleman 1987). This method has been elaborated and critiqued in later research (see Portes 1998; Pribesh and Downey 1999 for example). While this dissertation does not intend to delve into a critique of the manner that social capital is measured, the concept is useful when considering connections between social relationships made within schools and how they affect students' overall educational trajectory.

One would expect the salience of social networks and social capital to increase when changing schools because of the renegotiation of social relationships and management of institutional expectations which occurs (Hagan et al. 1996; Harter et al. 1992). For this reason, largely, researchers have used a social capital framework to examine school transitions (Muller and Schiller 2002; Schiller 1999; Baker and Stevenson 1986).

During the transition to high school, some social relationships are maintained and other ties are broken. This reconfiguration adds a layer of complexity to the impact of social relationships. Perhaps the best example of this is Schiller's (1999) research that finds that the maintenance of social ties is not beneficial for students with low academic achievement in middle school. An individual student's status among their classmates is likely to affect how they react to the transition to high school. Similarly, some social ties are disrupted to a greater degree than others. Affective ties, such as relationships with teachers and classmates, are linked to a specific set of social relationships whereas extracurricular involvement is institutionally-driven, possibly providing opportunities for new friends in high school. This study distinguishes between types of social relationships.

*1.5.2 Distinguishing Between Types of Social Ties*

Attachment to school is considered important psychologically as well as a critical component of academic success. Affective attachments to individuals, therefore, are essential (Croninger and Lee 2001; Rosenfeld, Richman, and Bowen 2000)—yet it is precisely these types of relationships that shift most dramatically during school transitions. In this dissertation, I consider two main sources of affective attachments in school—teachers and peers.

In this study, friends are hypothesized to play a key role of social support during school transitions. During the transition to high school, classmates experience school change together. This simultaneously creates an increase in the importance of peer relationships as well as a disruption and fluctuation of friendships. Research has found that the social support of peer relationships do mediate academic and social-

psychological adjustment outcomes of school transitions (Aikins et al. 2005) (Cantin and Boivin 2004; Berndt, Hawkins, and Hoyle 1986). In addition, the stability of friendships as well as friends' adjustment to the transition influence student outcomes (Berndt et al. 1999).

As David Sedaris noted, and researchers have found, status among peers—or popularity—is especially crucial during this developmental period (de Bruyn and van den Boom 2005). Popularity remains established among peers following a more stable transition but needs to be renegotiated among students in disrupted transitions, such as a high school transfer. Students who are considered popular—or those who have many friends within their school—have a larger social network from which to draw support. Therefore, both the status inherent in "popularity" as well as the social capital involved in accumulating more social ties are important aspects of popularity and give some indication that individuals are integrated more fully into the social system that is their school. The salience of having numerous social ties among peers, and the capacity to form them within the social system of schools, has been found to vary by gender (Wigfield et al. 1991; Little and Garber 2004) and race/ethnicity (Stanton-Salazar and Dornbusch 1995; Johnson, Crosnoe, and Elder 2001; Roderick 2003). Thus, the impact of social relationships left behind and carried with students in the transition to high school may differ along these dimensions.

Popularity may be salient for students only when a group of students transition together. For the middle school student attending an arts magnet, or for high school transfer students, most social ties are broken when changing schools. For this reason,

perhaps, transferring is largely considered more difficult as students get older, either because it could be more difficult to make friends, or there is less time within the grade span of the school to integrate into the school environment (Swanson and Schneider 1999; Fauth, Leventhal, and Brooks-Gunn 2005). In general, transfer students are less likely to report having a friend at their new school (South and Haynie 2004).

Social ties that are broken regardless of the type of school transition are bonds with teachers (Roeser, Eccles, and Sameroff 1998; Reyes et al. 1994; Midgley, Feldlaufer, and Eccles 1989a), which are perhaps the most useful to students because teachers can be considered institutional agents (Stanton-Salazar and Dornbusch 1995). When students are bonded with their teachers, they are less likely to drop out of school (Croninger and Lee 2001) and be more engaged in their school (Rosenfeld et al. 2000). It is unclear how the impact of school transitions affect adolescents differently when they are more bonded with teachers left behind at their previous school. Students may falter academically without these ties. On the other hand, the ability to bond with teachers may be an effective resource to use in the new institutional environment. I expect the reverse to impact students as well; students not bonded with teachers at their previous school may have more academic success by leaving that school and entering another—i.e., following a more divergent institutional pathway.

Popularity, ties to peers and bonding with teachers comprise social relationships characterized by affective attachments. This dissertation also considers institutionally-based relationships. Extracurricular involvement is an institutionally-driven avenue for creating social relationships within schools, and, as such, may more easily convey to a

new institutional context (Eccles 1999; Goldstein, Davis-Kean, and Eccles 2005; Mahoney 2000). As students move between institutions, a pattern of extracurricular involvement in both schools may be an especially effective way to make friends because the opportunity for friendship exists as a part of the institution rather than a specific set of social relations. A soccer player, for example, would conceivably try out for the soccer team regardless of the school. Research has found extracurricular involvement to particularly benefit students who are at-risk during school transitions (Mahoney and Cairns 1997).

This study explores whether affective attachments carry greater influence during school transitions, yet are potentially more salient in certain paths between schools. Institutional relationships, on the other hand, may provide stability in ever more disruptive transitions. Both dimensions of social relationships must be assessed to determine how renegotiation of social relationships affects students' academic consequences after a school transition.

Social relationships explored in this dissertation occur within schools and during a time of change. This implies a vital characteristic of school transitions—the movement between *two* institutions. The leaving school is where social relationships are disrupted and reconfigured in the new environment. The receiving school is only "new" from the perspective of the incoming students. Because schools are more or less self-contained social systems (Coleman 1996), they have a social climate all their own.

### 1.6 High School Social Environment and Social Opportunity

Research suggests that attributes of schools affect student integration and attachment to school (Rumberger and Larson 1998; Bryk and Thum 1989; Lee and Smith 1999; Anderson 1982), but has had difficulty pinpointing characteristics that are universally helpful to all students. For example, smaller schools were considered effective in promoting student achievement (Lee 2000) and attachment to school (Crosnoe, Johnson, and Elder 2004b), but other research finds that small schools are only more effective in certain circumstances (see Lee 2000 for a discussion of this research). Partly, this difficultly likely stems from informal processes occurring within schools that are less tangible, such as the normative structure of social relationships and social climate of schools. In this sense, schools can be thought of as social systems, each with a particular social organization involving norms with recognized status amongst students (Coleman 1996). Research has found variation of social climates within the social system of high schools (Coleman 1961; Crosnoe et al. 2004).

As mentioned in the beginning of this chapter, institutional pathways of school change are characterized by varying amounts of disruption of social relationships from middle school. Similarly, certain institutional pathways provide for greater social opportunity in high school. While the disruption of social ties may make the transition more difficult, the other side of the coin is that these students have a greater opportunity to create new social relationships in the receiving school. This may be advantageous for marginalized and/or vulnerable students, or it may serve to academically and socially

isolate these students even more. Either way, the opportunity to create new social ties plays a crucial role in the impact of school change.

In addition, other aspects of schools may factor into the social climate, which are implicit in the pathway followed, such as urban location and school sector. These aspects of schools are carefully considered throughout the construction of institutional pathways as well as providing context with which to interpret differences in student outcomes between the pathways.

### 1.7 Selection into School Transitions

Although most students must change school during adolescence, those who diverge such as transitioning from middle school to high school without classmates and those who transfer schools are not a random group of students. Therefore, care must be taken when considering the impetus to choose a high school that is not part of the dominant middle school feeder pattern and/or transfer during high school. Previous research on school transitions helps to shed light on possible factors affecting the choice to transition to a new school away from classmates, such as the presence of school choice and individual agency, concurrent life events such as residential mobility where the school change is only a consequence of some other change, and forced school change as a result of disciplinary problems.

In order to make a school change that is not a traditional transition to high school as a part of the district feeder pattern, the choice to change schools must exist. Typically, more urban areas support conditions with more choice of where to attend schools. In recent nationally representative studies of high schools, there is evidence that students

move without changing school at increasing rates. In High School and Beyond (HS&B) from 1980, 61% of students name residential moves as the reason for changing schools while only 17% state that they made a more strategic change of schools, seeking a better school or school environment (Lee and Burkam 1992). In the National Educational Longitudinal Study (NELS:88), residential moves do not necessarily indicate a school change and vice versa (Swanson and Schneider 1999). In their study using NELS, Swanson & Schneider (1999) find that among students who changed schools or moved, 11% change school but do not move, 13% move but do not change school while only 4% change both. Other research using these data reach a similar conclusion, that transferring schools during high school is not necessarily a result of a residential move (Rumberger and Larson 1998). This may stem from school choice programs and the increase of magnet school programs in urban districts (Plank et al. 1993; Langenkamp 2007).

Though there is evidence that changing school due to individual agency and/or choice is increasing, other concurrent events could also prompt a move such as a residential move or a family structure change. All residential mobility have been found to result in a loss of social networks, but research finds that some moves are associated with upward mobility (Fauth et al. 2005; Hanushek, Kain, and Rivkin 2004; Pettit and McLanahan 2003; Hagan et al. 1996), such as moving to a better school district. Frequent residential mobility, on the other hand, is considered a risk factor for students, partly because this type of moving is correlated with economic disadvantage (Pribesh and Downey 1999; Warren-Sohlberg, Jason, Orosan-Wein, and Lantz 1998; Wright 1999). In addition, children who do not live with both parents are also considered more likely to

move more frequently (Astone and McLanahan 1994). The disadvantage associated with lower socioeconomic status and family structure has even been considered as confounding the impact of moving (Pribesh and Downey 1999). Finally, expulsion due to behavior or academic difficulties may be another reason students change schools (Rumberger and Palardy 2005; Fleming et al. 2001; Bowditch 1993).

Each of the reasons for making a non-normative school change have their own connotations for interpreting the context with which the move takes place. As discussed in section 1.3.2, life course research focuses on the social context of life transitions (George 1993). The main "contexts" of school transitions explored in this study are social relationships, which are also related to the institutional pathway followed by students. However, reasons behind non-normative transitions are also informed by considering how they may affect the students' reaction to changing schools. For the transition to high school, students diverging from the main feeder pattern are likely doing so for two reasons: either their family is making a long-distance move or they are exercising choice of where to go to high school. This implies another, larger transition for the former and individual agency in the latter—both of which could inform how students adjust after the transition to high school. Transfer students are more difficult to gauge, since they are leaving one high school for another. The reasons summarized above for this change will be measured in analyses and considered as potential additional mechanisms affecting students in their new school.

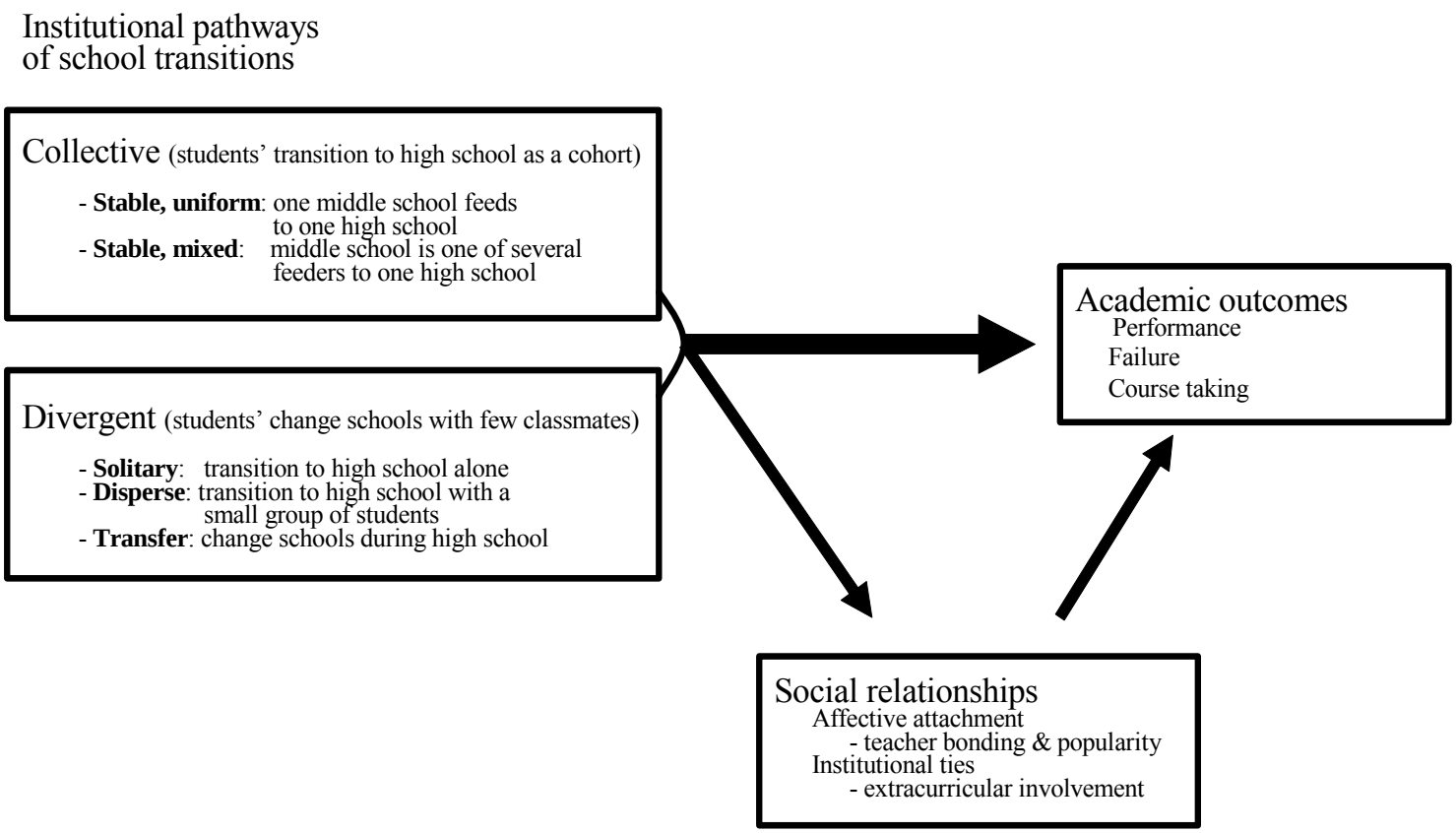
## 1.8 Overview of Dissertation

Chapter 2 explains the research methodology used in the dissertation. I describe the data utilized in this study, the National Longitudinal Study of Adolescent Health (Add Health) and its education component, the Adolescent Health and Academic Achievement (AHAA) study. This chapter describes the construction of institutional pathways, detailing both the structure of the data and how students move between schools from middle school throughout the end of high school in this national data set. In addition, I define measures used in analyses and explain in detail statistical techniques employed.

Figure 1.1 displays the conceptual diagram for this dissertation, highlighting the three main components of analysis: different institutional pathways, social relationships as potential mediators and the impact of these two on students' academic outcomes. Chapter 3 develops the contribution of conceptualizing student transitions as institutional pathways, as well as more precisely defines the use of these pathways in analyses for this study. Students' institutional pathways serve as the theoretical and methodological foundation for this study and are investigated in a separate chapter. Chapter 4 analyzes how middle school social ties affect academic outcomes in the first year of high school. It also considers whether the institutional pathway impacts any associations between social relationships and academic outcomes. Chapter 4 also establishes baseline academic results for cohorts of students transitioning to high school. Chapter 5 builds on these results and investigates processes related to student failure. In these analyses, I focus only on the collective transition to high school and explore how, even in the most stable transitions, the opportunity to create new social ties may be protective against failure and

low course placement in more constrained social systems. Finally, Chapter 6 compares the divergent pathways in the transition to high school and the divergent pathway of high school students—those who transfer during high school. While both are characterized by the most disruption of social ties, transfers occur outside of the structure of schooling, which may limit opportunity to create new social ties at their receiving high school. I also address whether effects of the transition to high school found on first year academic outcomes in Chapter 4 persist by the end of high school for those following divergent pathways. Chapter 7 briefly summarizes findings and considers their implications in light of current research on school transitions. Limitations are discussed as well as future directions.

Figure 1.1 Conceptual Diagram



## CHAPTER 2: DATA AND METHODS

### 2.1 Introduction

This chapter gives an overview of the National Longitudinal Study of Adolescent Health (Add Health) and it education component, the Adolescent Health and Academic Achievement (AHAA) study. These data are used throughout this dissertation as the primary data sources. I then discuss the intersection of the Add Health survey with student transcripts collected as a part of the complementary AHAA, which is relevant for analyzing student transitions. Finally, I describe measures used in analyses and describe the analytic plan for this study.

### 2.2 Add Health and AHAA Study

The National Longitudinal Study of Adolescent Health is a school-based survey of adolescents in $7^{th}$-$12^{th}$ grade from 132 public, private, and parochial schools (Harris et al. 2003). Add Health sample members were drawn from a random sample of 80 high schools with an $11^{th}$ grade, stratified by region, urbanicity, size, type, and racial composition. Project investigators first collected data using "in-school" questionnaires, administering the survey to all students present in school on the day the survey was given (August 1994 – June 1995). This original Add Health sample includes 90,118 students in 87 high schools and 58 middle or elementary schools that "fed" into the high school. The feeder schools were selected based on the proportion of students that contributed to the high school student population. More detailed information on the feeder schools will be discussed later.

The Wave I "in-home" interview was conducted from April 1994 to December 1995.[2] Add Health administered a census of in-home interviews in 16 schools, called "saturated schools." Wave I students in 7th-11th grades were followed up for a second wave of data collection from April to September, 1996 (Wave II). There are 20,475 students in Wave I and 14,738 students in both waves. Add Health is a rich resource of data on adolescent social lives within schools, chronicling the adolescents' peer relationships, romantic relationships, feelings about their school and other measures of social isolation, relationship with family, and participation in risky behaviors. The Wave I in-home data collection for the Add Health study also included a parent questionnaire given to the parent at home during the interview, typically the adolescent's mother. In addition, researchers collected information on the schools from administrators at the school, usually the principal at both Wave I and Wave II data collections. Finally, neighborhood contextual data, derived from secondary sources was collected for the students in the in-home sample.

Wave III of the Add Health study was conducted from July 2001 – April 2002, targeting all Wave I respondents. At this time, all Add Health sample members were at least 18 years of age (n=15,197 or 73% of the original Wave I sample). In addition, because of Add Health's emphasis on the social behavior and health in the transition to adulthood, Wave III Add Health respondents were asked to provide a list of sexual and romantic partners. A sample of heterosexual partners, stratified by whether they were

[2] A number of special oversamples were selected for in-home interviews including but not limited to certain ethnic groups (e.g. Cuban, Puerto Rican, and Chinese), those physically disabled, and siblings for genetic comparisons. These oversamples are not included in this study.

married, cohabiting, or dating, was selected from this list. Because the focus of this study is on school transitions during high school and prior to the inclusion of romantic partners, these respondents are not a part of the study.

While giving depth to the social context of the lives of adolescents, Add Health has limited information on the academic trajectory of youth. The education component, AHAA, corrects this limitation with high school transcript data and detailed information from the last school attended (Riegle-Crumb, Muller, Frank, and Schiller 2005; Muller et al. 2007). During the Wave III data collection, respondents were given a Transcript Release Form (TRF) that authorized Add Health to identify schools last attended by each study participant and request official transcripts from them. At this time, Add Health sample members were generally no longer in high school. The youngest Add Health grade-level cohort, those in 7$^{th}$ grade at Wave I, represents the high school class of 2000 while the oldest cohort would have been out of school for over six years.

Beginning in Fall 2001, high school transcripts and other data, described below, were collected from all Add Health high schools except two special education schools that did not maintain students' academic transcripts, and from approximately 1,300 additional schools where Add Health respondents last attended high school. Almost 93% of Add Health respondents signed a valid TRF (n=14,113) and AHAA collected high school transcripts for almost 87% of them—or nearly 80% of the Wave III sample (n=12,258). In addition, 1,262 partners signed a valid TRF, and AHAA collected 948 of their high school transcripts (see Riegle-Crumb et al. 2005 for more information). Additional information was also collected from the schools last attended by the AHAA

sample. Used primarily for coding the transcripts, school administrators were asked to complete a school survey about the grading practices, school policies, and special programs. Schools were also asked to list the textbooks used in each math and science course.

The transcripts collected were coded using procedures designed for the National Educational Longitudinal Study (NELS) and the National Assessment of Educational Progress (NAEP) and provide detailed data on students' grades, courses taken, the overarching academic structure of each student's respective school, and information on the last school each student attended.

*2.2.1 Sample*

Add Health and AHAA are ideal sources with which to study school transitions, particularly the transition to high school. In general, there are three basic types of Add Health schools: 1) middle school or elementary schools with middle school grade levels; 2) grade-inclusive schools (i.e., schools that span from $1^{st}$ – $12^{th}$ grade or $7^{th}$ – $12^{th}$ grade) and; 3) high schools. Although Add Health did sample some elementary schools, only middle school-age students were sampled in those schools. The study design of Add Health involved sampling 80 high schools with an $11^{th}$ grade and the schools that "fed" into them. Feeder schools were identified by the high school after its recruitment for the study. The high school listed names of feeder schools that they expected to contribute at least five students to the entering high school class and the approximate percentage of the high school's entering class coming from each feeder school. Then, a single feeder was selected for each high school; selection probability was based on the proportion of the

high school's entering class that came from the feeder (see Tourangeau and Shin 1999 for more information). There are a few cases of high schools with no feeder, either because they were grade-inclusive schools and were their own feeder, or the feeder school refused participation.

The data used throughout this study are taken from students with both Add Health Wave III survey data and a valid transcript. Although 15,309 students signed a transcript release form, 13,178 students have valid course-taking data from their collected transcript, of which 12,237 are non-partners. Of these, 11,500 respondents have a valid transcript weight and could be accurately placed in a grade level using methods discussed below; this sample comprises the core analytic sample for this study. The school sample includes almost all of the original Add Health schools; the core sample (n=11,500) are in 78 high schools and 53 feeder schools in Wave I. The coupling of large in-school samples for Add Health schools and contextual data on *all* schools last attended by sample members provide two advantages. First, these data allow for a comparison of students following different pathways who originate from the same middle schools. Second, a wealth of descriptive contextual data is available, providing a rich picture of common school characteristics within each pathway. These combined pieces of information allow more complete information about student pathways through school.

*2.2.2 Survey and Transcript Intersection*

One of the contributions of this study, and the AHAA data overall, involves using the intersection of survey and transcript data to analyze the impact of students' institutional pathways through schools. In order to identify transitions between schools,

the timing of this transition, and matching survey responses based upon this timing, it is first necessary to place students within schools at one point in time. Wave I, as mentioned above, occurred during the 1994-1995 school year.

Figure 2.1 graphically displays the intersection of the survey and transcript data. For example, notice that the Wave I 7$^{th}$ graders began high school after the administration of Wave II survey. In contrast, for the oldest cohort, the Wave I 12$^{th}$ graders, most of the high school courses appearing on the transcript were taken before they answered the Wave I survey questions. In fact, most of them completed Wave I toward the end of their senior year in high school. The timing of surveys, particularly studies involving transitions, must be considered when analyzing survey data along with transcript data.

While Add Health and AHAA constitute a wealth of information on adolescent social and academic experiences, Figure 2.1 demonstrates that care must be taken when analyzing data because survey data intersects adolescents' educational trajectory at different points depending on the cohort. This is particularly the case when considering students who transfer during high school. For example, timing of transfer for a Wave I 10$^{th}$ grader (i.e. during the 1994-1995 school year) must occur after 10$^{th}$ grade in order to utilize survey data from before the transfer. In addition, Wave I 7$^{th}$ grade students have survey data only from their middle school.

**2.3 Constructing Institutional Pathways**

The pathways that students follow as they transition between educational institutions in Add Health are grounded in research discussed in Chapter 1. Namely, the movement of students between institutions is an educational, developmental and even

sociological transition. While trends emerge from paths that students follow, the construction of pathways is heavily informed by these transitions as an important disruption in students' social relationships that promote academic achievement, on the one hand, and the opportunity to create new social ties, on the other. Therefore, the investigation here is both methodological and theoretical, where institutional pathways emerge from the Add Health and AHAA data yet are profoundly linked with students' social relationships and the opportunity for new social relationships among classmates of incoming students at the receiving school. I begin with the methodology used in data cleaning and coding for transitions in Add Health and AHAA. While a similar approach was taken for both the transition to high school and transfers during high school, these types of transitions have distinct methodological challenges and differences will be discussed.

### *2.3.1 Coding Transitions in Add Health and AHAA*

Add Health and AHAA intersect with each of the six cohorts at different points during their middle school and high school careers (see Figure 2.1). An advantage of these complementary studies is that they provide a wealth of information on students' educational trajectory across nearly a decade. However, to determine the effects of students leaving and entering a particular school between years, and the consequences this has on social relationships with their classmates, precision is necessary. This section summarizes the methodology used in coding all school transitions.

The first step for all students who changed schools was to determine which grade level and school students attended during the 1994-1995 school year. For middle school

students, the year they transitioned to high school (and what school was attended) also needed to be included so that cohorts entering the same school together could be analyzed. It is important to note some differences for middle school students in the transition to high school and high school students who transfer. While the same general method was used for each of these groups, all middle school students made the transition to high school and therefore the transcripts were analyzed for the entire cohort of 7$^{th}$ & 8$^{th}$ graders (and 9$^{th}$ graders who transitioned to high school in 10$^{th}$ grade). Only the first two years of the high school transcript were examined, because the goal was to determine what high school was attended immediately after the middle school transition. For the transfer students, only those students whose last school attended was not an original Add Health high school were cleaned in-depth. For these students, all years for that transcript data were available (up to six) were analyzed.

The general process involved combining two basic pieces of information. First, the grade range of all schools in Add Health and AHAA were identified using Add Health administrator data and AHAA contextual data from the Common Core Data and Private School Survey (CCD/PSS). In general, schools in this study are middle schools, grade-inclusive schools (e.g., 1$^{st}$-12$^{th}$) or high schools. To identify grade ranges of all schools last attended, I used two principal sources: the Add Health school information form that asked administrators to fill-in the grade range of their school and the Common Core Data (CCD) for public schools and the Private School Survey (PSS) for private

schools.[3] Table 2.1 shows the school types used in this study, for the schools attended by all study sample members with valid transcripts at Wave I (n = 11,500).

Next, timing of transition was determined with a combination of students' school identification number when entering the survey, the year students' began high school, and their self-reported grade level during the Wave I school year (1994-95). For a middle school student, a straightforward match would be the case of a student reporting she was in 7th grade during Wave I (or 8th grade at Wave II if her Wave I grade level was missing), her first year of high school was 1996, and she had a school identification number of a middle school or grade-inclusive school at Wave I. Similarly, a high school student would match, for example, if he has a self-reported grade level at Wave I of 10th, his first year of high school is 1993 and he is in an Add Health high school (see again Figure 2.1). Of the sample, 11,258 students matched in this manner (93.37% of the cases). Students who did not match were examined more closely using additional data sources.

When data sources were inconsistent, no one piece of information drove the decision to place students' in a grade level in a particular school. In general, students' self-reported grade level was typically used as a guide but not treated as fixed. Recall that the goal of analysis in the transition to high school is to capture students who enter high school at the same time. Therefore, retained students are excluded or included in the following year's cohort. For high school students, grade level is often misreported due to

[3] Some of the grade-inclusive schools had unusual grade ranges on the Add Health school information form, such as 6th – 13th. Because this level of detail was unnecessary for analytical purposes, the grade-inclusive schools were placed in one of two categories which may signify substantive differences: 1) 1st – 12th; 2) 7th-12th.

surveys conducted during summer months and/or the fluidity of grade level in high school (e.g., a freshman may take Geometry, often considered a sophomore level course).

After students' grade level and school were verified, course level transcript data was analyzed to determine the school attended after a transition took place. Each transcript included a flag attached to each course on students' transcripts that indicates a school identification number for where that course was taken. Additional flags indicate if the course was taken off-campus or if the course was a transfer course from some other school. There were three possible ID's attached to each course: 1) an original Add Health high school; 2) an alternate high school; 3) an ID given to students who attended high schools where a generic course catalog was used to code courses.[4] Therefore, each student had a combination of these three "school where taken" ID's attached to courses on their transcript.

In cases where more than one "school where taken" ID was present in a students' transcript, courses were summed in each year by each ID and a proportion of courses taken at each school was identified. For example, if a Wave I middle school student who entered high school in 1996 had 50% of their courses in that year attached to the Add Health high school and 50% of their courses attached to an alternative high school, that student was flagged as transitioning into the Add Health feeder high school but then transferring school mid-year in 9$^{th}$ grade. In cases that were still ambiguous after the step

[4] Because there were over one thousand last schools attended, course catalogs were not collected from all schools, particularly those with only one sample member last attending that school. Therefore, a generic high school catalog was used to code courses on these transcripts and the courses are flagged accordingly.

described above, additional flags such as transfer flags were used to determine students' movement between schools.

*2.3.2 Institutional Pathways*

Among the students in schools shown in Table 2.1, there are six possible patterns of school change made by students. These patterns are shown in Table 2.2 and are derived from the school ID of middle school students' high school attended in their first year of high school. This ID is released with other data from the AHAA education component and described in the user's guide (Muller et al. 2007). The most common patterns in grade-inclusive schools and high schools is for no school change to occur (n= 8,342), which is the case for 73% of the analytic sample. Of the Wave I 7$^{th}$ and 8$^{th}$ graders (and 9$^{th}$ graders in middle schools), 83% change schools for high school. This is slightly lower than other national estimates (Myers et al. 1995), which is most likely due to the fact that seven middle schools refused participation in the survey causing seven high schools to be surveyed without a matching feeder school. Finally, as Table 2.2 illustrates, 708 students transfer during high school, which is around 6% of the total analytic sample. These basic patterns were used to construct institutional pathways.

For transfer students, the divergent pathways were easily identified once students' grade level and schools' attended were determined.[5] Wave I high school students whose last school attended was a school in the original Add Health sample, and middle school students whose last school attended was not the same as the school they originally

[5] Initially, I also attempted to code the timing of transfer. As student records become increasingly complicated with additional mobility, timing of transfer was not reliably possible to determine for all transfer students.

transitioned into are categorized as transfer students. As shown in Table 2.2, most transfer students are those who left a traditional high school and transferred to another high school (n = 571). Some middle school students transitioned to one high school and then later transferred (n = 137) while a very few high school students attending a grade-inclusive school later transferred to another school (n = 24).

Conceptually, most of the variation between changing schools with the collective, or following a more divergent pathway, emerge from the cohorts transitioning to high school. Previous research has typically operationalized the transition to high school as a proportion of middle school classmates transitioning together (Schiller 1999). This gives an indication of the amount of disruption in social relationships from middle school to high school. Therefore, I first created a measure of the proportion of students transitioning together for each Wave I middle school cohort. These cohorts were measured as $7^{th}$ graders entering high school in 1996, $8^{th}$ graders entering high school in 1995 and $9^{th}$ graders who attend a $7^{th}$-$9^{th}$ middle school entering high school in 1995 as well. The proportion represents the basic feeder pattern, or the pathway students followed as they "fed" from middle school into high school and is weighted using sample weights to represent all students in their grade. As Table 2.2 show, some $7^{th}$ and $8^{th}$ graders in grade-inclusive schools transition to an alternate high school. Therefore, these students are considered in constructing the proportion of students transitioning together as well.

When thinking about the transition to high school as a movement between two institutions, the proportion of students' transitioning together to high school only represents half of the pathway. When students enter high school, their middle school

cohort contributes differential amounts to the incoming freshman class. In rural areas, one middle school feeds into one high school. Socially speaking, this pathway has minimal disruption for the middle school cohort. This is distinct from an urban area where several middle schools feed into several high schools. Therefore, the proportion of the incoming high school class represents an important part of the equation when considering disruption in the transition to high school and gives an idea about the opportunity to create new social ties at the receiving school.

Relative contribution to the incoming high school class for all high schools attended by middle school students was estimated from the number of middle school students who transitioned in each year divided by the freshman class size as reported in the Common Core Data and Private School Survey (CCD/PSS), which was linked to the schools attended by students in the AHAA study. See Appendix 2.1 for more information on the construction of this measure. By including the stability of the middle school class in the transition to high school *and* their relative contribution to the high school, four distinct groups emerged. First, some students transitioned with no other sampled classmates. Because the education data from AHAA are derived from the Add Health sample, it is important to recall that a census of students within schools is not available for these students. Therefore, "solitary" students may indeed transition with another middle school classmate who is not in the Add Health longitudinal sample. These students were placed in a separate group, labeled "solitary" where there is much disruption both from their middle school classmates and little contribution to the incoming high school class (n = 383). Then, due to the sampling procedure of middle

school utilized by Add Health, many of the students appeared to transition with most or all of their middle school class. However, this group could be divided in two after examining the middle school cohort's relative contribution to their high school. Some students transitioned with many and contributed to almost the entire incoming class. This is the most socially and academically stable transition, where the make-up of the incoming class is uniform to that of the middle school class. The other group is also stable in terms of the institutional pathway from middle school, but more of a heterogeneous group enters the high school—i.e., students from many other middle schools. These two groups, respectively, are labeled stable, uniform (n = 1,315) and stable, mixed (n = 832). The remaining students disperse with a small group of students to an alternate high school from the main feeder. Therefore, these students do not transition alone, but their transition to high school is still characterized by a lot of disruption of social relationships. This group is labeled as following a "dispersed" pathway (n = 514).

It is important to remember that institutional pathways are methodologically characterized as such that they are a *student by school* measure. Therefore, the pathway is neither a characteristic of schools nor of students but rather an interaction between the two. For example, one middle school could have students who follow a stable, mixed pathway, a divergent pathway and a solitary pathway in the transition to high school. In addition, the pathways were constructed separately by cohort since the disruption of social ties are a key theoretical component under consideration regarding implications of what institutional pathway is followed. Therefore, the pathways followed by students in

an individual school could fluctuate year by year. This could be due to several factors. From a substantive perspective, districts could be changing size—growth would suggest an offering of additional choice while districts reducing their size would offer less choice. This may also be due to sample selection.

As shown in Appendix 2.1, much care was taken in utilizing sample weights when constructing institutional pathways to avoid pathways being driven by sample selection. The area of most concern involves schools that fluctuate between the two stable pathways from year to year. This occurs in six schools, four of which are grade-inclusive schools. Each of these six cases were analyzed more closely to verify that patterns of students' transitioning to high school actually fluctuated between cohorts and were not mislabeled due to cut-offs of proportion of students' transitioning together in creating the institutional pathways.

**2.4 Analytic Measures**

This study includes measures that address the main theoretical components discussed in Chapter 1. The main independent variables, the transition to high school and transferring during high school will be addressed in their own chapter because the institutional pathways serve as the methodological and substantive foundation for each of the analytic chapters. Below, I outline the other measures used throughout the dissertation.

*2.4.1 Academic Outcomes*

This study considers academic outcomes that give a general picture of processes of student success and failure both at the beginning and end of their high school career. All academic outcomes are taken from student transcripts.

In Chapter 4, overall GPA and math course taking are used to establish baseline academic adjustment for students in the transition to high school, and any differences that may emerge by the institutional pathway followed. Students' GPA at the end of their first year of high school captures general academic adjustment to the new school. First year GPA is an average of grades in all courses taken in that year. For most students, this is their 9$^{th}$ grade GPA. For students who transition from a 9$^{th}$ grade middle school to a 10-12$^{th}$ grade high school, their first year GPA is from 10$^{th}$ grade. Math course placement is an important outcome to consider at the beginning of high school. Math is typically sequential and hierarchical in its structure of courses in high school, where beginning course sequence heavily impacts math attainment by the end of high school (Schneider et al. 1998). I focus on more or less "on-track" math placement as a minimal measure of progress. For 8$^{th}$ grade middle school students, this is placement in Algebra I or higher while for 9$^{th}$ grade middle school students, this is placement of Geometry or higher. These courses are chosen for substantive and methodological reasons. First, the overwhelming majority of students in these grades are placed in these courses, and they are considered normative for those respective grade level both for AHAA students (Riegle-Crumb 2006) and nationally (Davenport et al. 1998). Second, Algebra II is considered a gate keeping course for postsecondary attendance (Adelman 1999), and

those in Algebra I in 9th grade are "on-track" to reach Algebra II by the end of their high school career.

In Chapter 5, I investigate processes of failure and student vulnerability in the transition to high school. Therefore, I use the same outcomes discussed above, yet explore the probability of failing a course in the first year of high school and low course placement. Course failure is taken from a failure index and is coded as failing any part of any course (1). Low math course placement is measured as placement in remedial math or pre-Algebra for 8th graders transitioning to high school while for 9th grade middle school students this measure is defined as placement in lower than Geometry at 10th grade after their transition to high school.

Finally, Chapter 6 analyzes end of high school academic outcomes for students to gauge persistence of processes for middle school students in the transition to high school as well as additional vulnerability associated with transferring. End of high school academic outcomes analyzed in this study include variations of those discussed above—such as cumulative GPA, course failure at the end of high school, and highest math course achieved. Cumulative GPA gives a general baseline of picture of student success, performance and integration into high school. This final chapter also includes course failure at the end of high school for two reasons. First, results from Chapter 5 illustrate that processes of success and failure are somewhat distinct. Second, those following divergent institutional pathways are considered to be especially vulnerable to failure that makes it a relevant measure for this population. Finally, due to its association with

postsecondary attendance, I predict whether or not students reach Algebra II or higher by the end of high school.

### *2.4.2 Social Relationships*

As discussed in Chapter 1, this study distinguishes between types of social ties, which have distinct implications when students change schools.[6] Social ties are considered in two dimensions, characterized by affective attachments or institutional connections. Measures of affective attachment tap into students' social-psychological connection to others in their school, and possibly others transitioning with them from middle school to high school. These are the social ties most severely disrupted when a school change occurs. Institutional connections, on the other hand, serve a dual purpose. They measure levels of student integration into the previous school, as well as represent connections to the institution of education that may more easily convey into a new school.

#### *Affective Attachment*

The first type of social relationships taps affective ties to teachers and peers in school, such as teacher bonding and student popularity among peers. Teacher bonding promotes academic achievement (Croninger and Lee 2001), gives students access to informal knowledge in their school (Stanton-Salazar and Dornbusch 1995) and is a commonly-used measure of attachment by Add Health researchers (Resnick et al. 1997;

[6] Extensive preliminary research investigated other measures of social ties as well, such as school attachment, social acceptance, and fighting/aggressive behavior. The affective attachment measures used in this study are those which are the best theoretically motivated in empirical research overall, but also have substantive meaning as important during school transitions. Furthermore, adding these other measures of social relationships to multivariate models does not change statistical significance of the core social ties described in this chapter and used throughout this study.

Crosnoe, Johnson, and Elder 2004a; Crosnoe and Needham 2004). Bonding with middle school teachers is measured with three questions ($\alpha = .64$): teachers treat students fairly (1 = strongly agree to 5 = strongly disagree), how often students have trouble with their teachers (0 = never to 4 = everyday) and teachers care about them (1 = not at all to 5 = very much). All teacher bonding responses were reverse coded when necessary such that higher scores indicate stronger bonds.

Popularity among classmates, an indication of both increased social support and status among peers (de Bruyn and van den Boom 2005), was calculated using Add Health friendship data and is a count of the number of sampled students nominating an individual respondent as a friend (range = 0 – 32). In this sense, "popular" students are those who are more often nominated as friends amongst their classmates. This gives some indication of status, but also centrality among peers within their school as well as integration into the social system of their school. Four Add Health schools did not have valid friendship data, and students from these school were eliminated from analyses. Students with no nominations attending schools with valid friendship data were given a zero on this measure.

*Institutional Involvement*

Adolescents' participation in school sports or clubs, which promotes integration into school (Mahoney 2000), is taken from the in-school survey asking students to list activities in which they are involved at school. The list of activities for which students' respond regarding their participation is quite extensive, and preliminary research explored a variety of ways to operationalize participation in extracurricular activities.

Sampled students' involvement in specific activities, such as sports or band, was not large enough to analyze types of activities separately. Therefore, the next step was to sum all activities together. On this measure, the range of student involvement in activities was 0-33 activities.

Further analysis revealed the modal involvement in extracurricular activities to be zero. Therefore, to dichotomize involvement in none or one or more was possible, but this operationalization grouped such a variety of involvement together, yielding an ambiguous meaning for the measure. Because I wanted to tap integration into school, I chose rather to measure above average involvement in extracurricular activities as a binary variable. The final measure of institutional involvement, therefore, is above average participation in activities at school across the sample, which equate to three or more activities.[7]

*2.4.3 Other Measures*

Other measures used in analyses are discussed below and grouped into the following categories: prior academic achievement, other disruptions, demographic controls and high school contextual information.

*Prior Academic Achievement*

For analyses of middle school students in the transition to high school, prior academic achievement consists of middle school academic achievement, taken from self-reported grades in math, science, language arts, and social studies. Middle school GPA is

[7] Analyses also explored whether mean levels of involvement differed by the sending schools. While involvement in some schools did vary, it did not vary by much. In addition, multivariate models which included mean level of extracurricular involvement by school, rather than overall, produced similar results to those presented in this dissertation.

a continuous measure averaged across subjects. Analyses with end of high school outcomes control on initial high school academic measures, such as first year GPA, course failure in the first year of high school, and math course placement. Because some middle schools end in 9th grade and middle school students begin high school in 10th grade, first year measures for end of high school performance outcomes (see Chapter 6) are measured in 10th grade. Math course placement, which is sequential, is always measured in 9th grade when it is a control for an end of high school outcome.[8] Due to control measures for Chapter 6 functioning as outcome measures in Chapter 4 and 5, the operationalization of first year GPA, first year course failure, and math course placement is discussed in section 2.4.1.

*Other Disruptions*

As discussed in Chapter 1, previous research has identified several concurrent events associated with school mobility. As bivariate descriptive statistics will demonstrate, measuring other disruptions is particularly important for students following divergent pathways both in the transition to high school as well as those who transfer. First, family structure change is taken from family structure constructs created by Add Health researchers for Wave I and Wave II (1 = change between waves). Second, respondents indicated in Wave I how long they have lived at their current residence. Those responding less than a year were considered to have moved recently. For these two measures, it is important to recall that these did not necessarily coincide with the

[8]Analyses explored whether or not this made a difference in results for the three middle schools and three high schools where the grade structure was 7-9 and 10-12, respectively. Results are similar to those presented in this study.

transition to high school or school transfer. For that reason, they must simply be considered proxies of residential and family structure changes occurring around the time of school transitions. Third, students responded to a question about length of time at their current school. If their grade level was not the first grade level at the school in Wave I (e.g., $7^{th}$ grade in a $7^{th}$-$8^{th}$ grade middle school), students were considered a recent transfer into that school.

*Demographic Controls*

All analyses controlled for respondents' demographic characteristics measured at Wave I. Control variables include sex (1 = female), racial or ethnic identity with dummy variables for non-Latino white, Asian-American, Latino, African-American, and other race/ethnicity (ref. = non-Latino white), parents' highest education level (1 = eighth grade or less to 9 = professional training). In addition, family structure is measured as a series of dummy variables for living with both biological parents (reference), a parent and stepparent, single mother and other family structure.

*High School Context*

One of the advantages of linking the AHAA study to Add Health survey information involves the addition of contextual information on middle schools and all high schools last attended. Typically, analyses minimally control on three characteristics of high schools: urban location, size and school sector. While these are somewhat reflective of distinct types of districts where institutional pathways differ, multivariate models also control on these characteristics as possibly influencing academic outcomes independently from the pathway followed. Urban location gives some indication of

potential to choose more divergent pathways, as students in urban settings have a larger choice set of high schools to attend. Urban location is taken from the CCD/PSS, linked to Add Health data as part of the AHAA study, with dummy variables for city, fringe of a city or a suburb (reference), town and rural. Next, high school size is included in analyses, also taken from the CCD/PSS and is a count of total students in the high school.

While measures of high school context are extremely useful for descriptive analyses, these measures are rarely statistically significant in multivariate models. The high school contextual measures discussed above are retained in multivariate models when significant, which only occurred in Chapter 4. Recall that this chapter investigates all students who make the transition to high school, in which there is variation of high school location, size and sector by each pathway. Chapter 5 only analyzes students following a collective pathway, in which there is intentionally less variation between schools so it is not surprising that these are not statistically significant, and students in Chapter 6 disperse to a wide variety of high school, where the contextual measures above were not associated with end of high school outcomes.[9]

## 2.4 Analytic Plan

As discussed above, the academic outcomes in this study measure facets of students' academic adjustment and progress first in the first year of high school and then at the end of students' high school careers. Mulivariate models utilize Ordinary Least Squares (OLS) regression for first year GPA and cumulative GPA, and utilize logistic

[9] This is not to say that school context does not matter, nor that it will not play a role in academic outcomes after a school change. Supplemental analyses indicate that, when utilizing Hierarchical Linear Modeling (HLM) techniques, cross-level interactions between the type of transition made and some school contextual measures such as school size are associated with academic outcomes. This is outside the scope of this study and is discussed as a future direction for analyses in Chapter 7.

regression for models predicting first year math course placement and course failure in the first and last years of high school. All models are weighted using Add Health sample weights. In addition, all multivariate models were analyzed using STATA, which corrects for the study design.

Multivariate analysis for each chapter involved extensive preliminary analyses during which models were built beginning with basic demographic controls then adding other disruptions such as family structure change. Then, institutional pathways and prior academic achievement were included to models. Next, I included affective attachment measures and extracurricular involvement separately. At times extracurricular involvement was statistically significant when included as the only type of social relationship and then no longer statistically significant after including measures of affective attachment. This suggests that the social relationships occurring within the extracurricular activity are related to the outcome, which underscores the importance of this type of involvement. However, lack of statistical significance in some circumstances when including affective ties, which capture social relationships more directly, suggest that affective ties are more strongly associated with the academic outcome than extracurricular involvement—or that affective ties explain part of why these institutional ties are important for academic adjustment. These instances are noted in the results section of each analytic chapter. Demographic controls, other disruptions, institutional pathway, prior academic achievement and social relationships consist of the baseline models predicting the academic outcomes and are presented as Model 1 in Chapters 4-6.

The second set of models included two types of interaction terms. Similar to the approach taken by Schiller (1999), who found that students' middle school academic status interacted with the type of feeder pattern to influence high school GPA, models include interaction terms for the institutional pathway followed with middle school GPA and middle school social relationships. Second, students' integration and attachment to their school, measured by affective attachment and extracurricular involvement, may vary according to how successful they are in school. Therefore, I also include interactions between middle school academic performance and students' reported affective attachment and extracurricular involvement. Interactions are mean centered (Cohen and Cohen 1983), which reflects the average difference between groups when all other variables are zero, easing the interpretation of results. Models with non-centered measures yielded similar results.

This analytic plan is informed by preliminary work with school transitions, as well as extensive descriptive analyses. This preliminary work is highlighted in Chapter 3, which focuses on the construction of institutional pathways in this study and describes bivariate patterns within these data.

Figure 2.1 Intersection of Add Health Surveys and AHAA Transcripts, by Cohort Grade Level

| | Add Health Survey | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **School Year** | **90-91** | **91-92** | **92-93** | **93-94** | **94-95** | **95-96** | **96-97** | **97-98** | **98-99** | **99-00** |
| **Cohort** | | | | | **(Wave I)** | **(Wave II)** | | | | |
| **1** | | | | | **7** | **8** | **9** | **10** | **11** | **12** |
| **2** | | | | | **8** | **9** | **10** | **11** | **12** | |
| **3** | | | | | **9** | **10** | **11** | **12** | | |
| **4** | | | | **9** | **10** | **11** | **12** | | | |
| **5** | | | **9** | **10** | **11** | **12** | | | | |
| **6** | | **9** | **10** | **11** | **12** | | | | | |

Table 2.1 Student and School Level Frequencies of Schools Attended at Wave I, by School Type

| | Schools | Students |
|---|---|---|
| Middle schools | | |
| Kindergarten - 8th | 6 | 237 |
| 5th - 8th | 1 | 31 |
| 6th - 8th | 32 | 1,355 |
| 7th - 8th | 11 | 590 |
| 6th - 9th | 1 | 57 |
| 7th - 9th | 2 | 177 |
| Total | 53 | 2,483 |
| Grade-inclusive schools | | |
| 1st - 12th | 9 | 724 |
| 7th - 12th | 9 | 1,239 |
| Total | 18 | 1,963 |
| High schools | | |
| 8th - 12th | 1 | 132 |
| 9th - 12th | 56 | 5,685 |
| 10th - 12th | 3 | 1,273 |
| Total | 60 | 7,135 |
| Sample total | 131 | 11,500 |

Table 2.2. Basic Student Transition Patterns for All Wave I Sample Respondents with a Valid Transcript and Sample Weight

| | Wave I Middle School Students | | Wave I High School Students | Total |
|---|---|---|---|---|
| | Grade-inclusive school | Middle school | | |
| No school change | 495 | -- | 7,847 | 8,342 |
| Transition to a separate high school only | 116 | 2,310 | -- | 2,310 |
| Transition to high school then transfer | 0 | 137 | -- | 137 |
| Transfer during high school only | 24 | -- | 571 | 595 |
| Total | 635 | 2,447 | 8,418 | 11,500 |

# CHAPTER 3: INSTITUTIONAL PATHWAYS

The purpose of this chapter is to develop the contribution of conceptualizing student transitions as institutional pathways, as well as more precisely define the use of these pathways in analyses for this study. First, I discuss collective and divergent institutional pathways in general terms, and how they can be used to address and acknowledge issues of endogeneity. Next, I elaborate how each of the three analytic chapters use institutional pathways, as well as how they indirectly clarify and help further understanding about selection issues and the ways that the educational system processes students. This is accomplished by exploring similarities and differences between and within the institutional pathways, and using this information to inform and interpret later findings concerning consequences of changing schools on students' academic trajectory.

## 3.1 Collective and Divergent Institutional Pathways

Research has identified ways that school transitions impact students in developmental, psychological, educational and sociological realms. Students' school transitions during adolescence coincide with a crossroads in each of these domains, at the heart of which involves individual adjustment relative to the institution of education. School transitions represent a window of insight into the processes of student alignment and realignment as they move through the educational system. Where do they "fit" into this new social system? Who is vulnerable? Who excels? These questions imply two key aspects involved in transitions—the disruption and reconfiguration of social relationships and academic success in the new school. On the one hand, the explicit purpose of schools

is the transference of knowledge, where academic achievement and persistence are examples of success within the institution. On the other, researchers across disciplines agree that social ties made within schools are an essential gateway to this success (Eccles et al. 1993; Anderson 2002; Coleman 1987). Both academic trajectory and social ties are disrupted and reconfigured when students change schools.

Yet school transitions are not monolithic. A crucial distinction when considering the consequences of student transitions is that students follow different pathways. Broadly speaking, transitioning pathways can be identified as collective or divergent. Collective pathways involve cohorts of students moving between schools, which is more or less equivalent with following the traditional trajectory of the structure of schooling in the United States. Divergent pathways involve students who deviate from this traditional structure. These pathways are characterized in part by the disruption of social relationships when students change schools. Inherent in these distinctions are fundamental sociological concepts. In simplest terms, transitioning with the collective denotes the dualism of social support and constraints of social status and expectations. These are the students who move between schools in a normative manner, where the sorting of students takes place within a more or less constrained social system. Following a divergent pathway is characterized by more social isolation, but not without the possibility of transformation and freedom to explore a new social and academic identity. Admittedly, these are oversimplifications of distinctions between collective and divergent pathways—yet they represent realities students confront when facing the movement

between institutions and fundamental dualities involving integration into society and participating in that society as a part of social groups (Durkheim 1951; Simmel 1902).

As discussed in Chapter 2, there is variation even within the collective and divergent pathways once a more complete picture of transitions is considered—i.e. as the movement of students between institutions. Students may transition with the collective in a more stable school change, but their receiving school is likely in a system where many middle schools also feed into their high school. Types of divergent transitions differ by timing—they can occur when all students are new to the school, such as the transition to high school, or where a student transfers for a reason other than graduation.

### *3.1.1 Selection into Schools*

Implicit in institutional pathways is the act of choice. Between and within collective and divergent pathways are individual students "choosing" schools for one reason or another. Selection into schools has historically been a function of residential choice (Long 1975), but is increasingly also potentially a function of school choice (Plank et al. 1993). To some extent, selection of students into certain schools is a concern with any research on schools, particularly later in the educational trajectory. It is of particular concern when attempting to capture effects of student transitions. At the forefront of any research on school transitions is one key question concerning selection: how much of the impact of transitions is due to endogenous factors? As noted in Chapter 1, research finds that mobile students are often mobile due to the following reasons: a conscious choice on the part of themselves and/or their parents, making an innocuous residential change—or they are shuffled between schools for reasons that place them at-

risk such as family structure change, economic disadvantage or behavioral problems. In each case, other factors contribute to ways that the disruption of social ties may affect integration into the new institution, creating a cumulative disadvantage where one single facet of the change is unlikely to take precedence (Tucker, Marx, and Long 1998; Simmons, Burgeson, Carlton-Ford, and Blyth 1987). In other words, the disruption of social ties is still a crucial component of the school change, but other factors influence how this change affects the individual as well. While endogeneity, particularly in the study of student transitions, cannot be completely accounted for—it can be addressed such that it is minimized, as well as a tool to further understand the consequences of school change. The reality that students travel through school along somewhat predictable patterns allows researchers to further understand the ways that the system of education processes students and reveals how students interact with their school which results in their to success or failure in school.

In this study, the construction of institutional pathways both reinforces patterns of students moving between schools, as well as helps to account for them. By conceptualizing student transitions as institutional pathways, students are grouped together along expected dimensions such as urban location, racial segregation and elements of school choice such as school sector. Aligning students along these dimensions reinforces sociodemographic patterns of students moving between schools that are common attributes of the educational system in the U.S. Yet this also allows for comparisons of processes occurring between types of pathways and reflects the diversity of districts and schools in the American system of education. What are the consequences

of transitioning in different pathways? What mechanisms affect academic adjustment? In this study, I focus on one central mechanism of school change—the maintenance, disruption and reconfiguration of social relationships as students change schools and how these vary according to what pathway is followed. These are explicit consequences of changing schools. In addition, I investigate implicit differences that also play a role in effects of school transitions. First, as a movement between two institutions, students' social opportunity is the opportunity to create new social ties at their receiving school, and is directly linked to the institutional pathway followed by students. Second, the structure of schooling produces distinctions between types of transitions. Namely, whether the transition occurs as a normative grade change (preceded by graduation) or for some other reason, constituting a transfer. Entering a new school is quite different when changing school within the structure of schooling or outside of this structure, and the impact this has on the disruption and reconfiguration of social relationships. Adding these explicit and implicit mechanisms allows differentiation between institutional patterns of student movement between schools.

Another way to further understand consequences of school change and what this implies about institutional management of students' educational trajectory is to compare students within similar pathways. In this study, I make this comparison in two ways. First, I compare the collective pathways for differences related to the opportunity for new social ties at the receiving high school. Second, I compare types of divergent pathways along the lines of the structure of schooling (e.g., transition to high school versus high school transfers) to help determine which is most disruptive to students' overall academic

trajectories. Throughout comparisons between and within institutional pathways, the disruption and reconfiguration of social relationships are a common thread that is characteristic of every change in schools. These social relationships made and broken with school change are continuous in each analysis of school transitions and ground results involving the more implicit mechanisms. Below, I describe each of the ways that institutional pathway are investigated in this study, which mirror analysis in subsequent chapters.

### 3.2 Differences between Pathways—the Transition to High School

In this study, the majority of analyses on differences between institutional pathways focus on the transition to high school. As discussed in Chapter 2, four distinct pathways emerged from Add Health middle school students as they transition to high school. Figure 3.1 displays these four pathways: 1) stable, uniform; 2) stable, mixed; 3) dispersed; 4) solitary. The black portion of the pie graph illustrates the proportion of students from the sending school transitioning together (left column) and the proportion of the incoming high school class at the receiving school (right column).

The stable, uniform and stable, mixed pathways are named as such because their transition involves stability of social ties for students from the sending school. These are the students who follow a collective pathway. However, as Figure 3.1 demonstrates, there are two variations of the collective pathway. The students following the stable, uniform pathway not only transition to high school with an average of 91% of their middle school class, they contribute almost entirely to the make-up of the incoming high school class (99%). However, while students in the stable, mixed pathway transition with almost as

many classmates (80%), they comprise only an average of 47% of the incoming class. For the transition to high school, dispersed and solitary pathways comprise divergent pathways. In the dispersed pathway, middle school students diverge from the traditional feeder pattern of their high school, but they do not do so alone. Therefore, students following dispersed pathways carry with them remnants of their middle school social structure by transitioning with an average of 33% of middle school classmates. But, they also have ample opportunity to make new social ties upon entering high school, comprising only 21% of the incoming class. Students following the solitary pathway characterize the most disruption in the transition to high school. These are students who transition without any of their sampled classmates.

Figure 3.1 clearly illustrates differences between pathways that have implications on both the disruption and reconfiguration of social ties in the transition to high school. In addition, the high school social climate among incoming students likely varies due to differential contribution of feeder middle schools. Some districts involve only one middle school feeding into one high school, whereas in others there is much more reordering of students as they enter high school. The disruption, stability and reconfiguration of social ties are considered a major mediator for incoming students' academic outcomes in this study. Social relationships are an important component of academic success and persistence, and signify integration into the institution of education. Life course research on transitions suggests that social relationships will play an especially crucial role during a school transition; the consequences of transitions have been shown to depend largely upon the context with which they occur (Wheaton 1990). In other words, those who are

highly attached to their former school may benefit from a more stable transition, and vice versa.

However, before these mediators can be addressed, it is important to first consider sociodemographic patterns and school characteristics that typify each institutional pathway in the transition to high school. This not only gives a broader picture of students' experiences following each institutional pathway, it allows for further understanding of potential endogenous factors associated with patterns of academic outcomes between institutional pathways. I accomplish this in two ways. First, I discuss general demographic differences between students in each of the four pathways to high school. Then, I display patterns of sending and receiving school characteristics in the institutional pathways.

### *3.2.1 Demographic Characteristics*

Table 3.1 displays selected descriptive statistics for the middle school student sample and by institutional pathway followed in the transition to high school. Here, we see that non-Latino white[10] students are overrepresented in the stable, uniform pathway, with a proportion of .77 white compared to an overall sample proportion of .68 white. Whites are likewise underrepresented in the divergent pathways—dispersed and solitary—comprising only around half of students following these pathways.

There are also differences between pathways in the transition to high school involving parents' level of education. Namely, those following the collective pathways have higher average levels of parents' level of education. Parents' level of education, as

[10] For the remainder of this dissertation, I will refer to non-Latino white students simply as "white."

described in Chapter 2, is a nine point scale where a 6 indicates some schooling such as postsecondary or trade after high school, but no degree. Therefore, those following the divergent pathway, on average, have parents with no postsecondary education.

Finally, Table 3.1 illustrates that family structure differences between pathways emerge as well, most notably in the divergent pathways. Here, fewer adolescents live with both parents: .58 in the dispersed pathway and .56 in the solitary pathway compared to a middle school student mean of .60. Students who follow the solitary pathway to high school also report family structure changes between Waves I and II at higher rates. Not surprisingly, given research finding correlations between family structure and residential mobility (Astone and McLanahan 1994), these students also report having recently moved twice as often as the overall middle school sample.

While most students attend middle schools comprising $6^{th}$-$8^{th}$ or $7^{th}$-$8^{th}$ grades across different types of pathways, certain less common grade structures are overrepresented in some pathways. For example, students who follow stable, uniform pathways and solitary pathways, as shown in Table 3.1, are found in grade-inclusive schools at higher rates. It is not surprising that there is less disruption in grade-inclusive schools because children do not have to change schools when entering high school. Those students who leave these schools, therefore, likely do so alone and follow the solitary pathway to high school. This suggests that solitary students, at least those who transition away from a stable, uniform school district are likely making a residential move at the same time. In addition, very few students in the dispersed pathway come from grade-inclusive schools (.07) and overwhelmingly transition to high school from a more

traditional middle school (.74). This adds to evidence that these students are in large suburban or urban districts and/or in public school.

### *3.2.2 School Characteristics*

Table 3.2 allows for further understanding of institutional pathways with descriptive statistics of sending and receiving schools among each of the four pathways in the transition to high school. It is important to recall, as mentioned in Chapter 2, that institutional pathways are constructed as such that they are a student by school level of measurement. Therefore, Table 3.2 shows school means for students' sending and receiving schools, yet the descriptive statistics are at the student level. This has implications for the discussion of institutional pathways and what kinds of information can be ascertained from the school characteristics common among students following the same pathway to high school. In some respects, certain institutional pathways are characteristic of school systems. A rural system is the simplest case, which have mostly stable, uniform pathways due to lack of choice to attend another school. The more divergent pathways—dispersed and solitary—occur in all school systems. Differences in urbanicity, size and other mean values of the schools students attend in each pathway help further understand the context of the institutional pathway. These differences are discussed below, as well as how opportunity for choice factors into the context of following different institutional pathways.

As shown in Table 3.2, over half of students in the stable, uniform pathway attend middle school and high school in smaller towns or rural districts. Receiving high schools of students in the stable, uniform pathway have fewer minority students and are smaller

than the sample, with an average of around 900 students. Students in the stable, mixed pathway attend schools that are largely in urban districts, and the receiving high schools in this pathway are larger than the sample with around 1,575 students. Students following the dispersed pathway also predominantly attend school in urban districts, as well as schools with a larger proportion of minority students both at the sending and receiving school. In addition, more students following a dispersed pathway attend private school in middle school. This suggests that these private middle school students may diverge after 8th grade and change sectors by attending a local public high school, since students in this pathway attend private high schools around the sample rate. Very few students following a dispersed pathway attend high schools in smaller town or rural districts (.07 total), and many attend a Title I eligible school[11] (.19 versus .12 for the sample average).

The solitary pathway is followed by students in cities at greater rates, and they transition from middle schools that have a higher proportion of minority students. These students also attend Title I eligible schools at higher rates than their peers. Finally, a note of caution regarding the high school characteristics of students following a solitary pathway in the transition to high school: these students have more missing data on the high schools than their peers in other pathways. While AHAA attempted to collect high school transcripts from all last schools' attended, if only one student last attended the high school, it was more likely that data were not collected from that high school.

[11] Title I schools are those with a high concentration of economically disadvantaged students and qualify for additional monetary and programmatic assistance from the federal government. More information can be found at http://www.ed.gov/policy/elsec/leg/esea02/pg1.html.

These descriptive statistics provide a clearer general picture of what types of students and schools comprise each of the four pathways. Furthermore, this allows us to see the differences between the two collective pathways, as well as the heterogeneity in the divergent pathways in the transition to high school. Those following the stable, uniform pathways attend more racially homogeneous, small high schools in smaller towns and rural areas. They are largely white. In contrast, students in the stable, mixed pathways attend larger high schools in predominantly urban areas. In addition, while the overall proportion of students in this study who attend magnet high schools is small (.02), students in the stable, mixed pathways attend a magnet high school at twice the sample rate. In the divergent pathways in the transition to high school, there are fewer white students and students attend high school with a larger proportion of minority students. In addition, there is some indication of heightened disruption in other parts of their lives, as these students generally experience family structure changes and/or recent residential moves at higher rates. In the dispersed pathway, more students attend a traditional middle school (e.g., grades 6-8) in urban areas. In the solitary pathway, there is slightly more private school attendance in both middle school and high school.

Finally, Table 3.2 displays some rough indicators of school choice. While data on all possible high schools in the students' district are not available, it is possible to determine whether middle school students attended high schools in the same district that are not the sampled Add Health feeder high school. Choice indicators are discussed in two ways. First, Table 3.2 has a series of dummy variables that indicate whether middle school classmates had any choice in which high school to attend: 1) any middle school

classmates attended a private high school; 2) any middle school classmates attended a non-Add Health high school in the same district as the Add Health high school; 3) either one or two, which indicates multiple ways of exercising choice. Second, the proportion of middle school classmates who attended a choice high school is also shown in Table 3.2.

Around half of the students are in districts where none of their classmates attend alternate high schools in the same district, including private high schools. This likely indicates a system where there is no other high school for students to choose, such as a rural school system. Almost a quarter of middle school students have classmates who exercise choice by attending an alternate high school and/or private high school. Not surprisingly, students in the stable, uniform pathway have the fewest number of classmates who report any choice while those in stable, mixed, dispersed and solitary pathways appear to attend middle school with classmates who choose from a variety of options of where to attend high school. These indicators of choice help provide a more complete picture regarding implications of following the four pathways in the transition to high school—and how having strong or weak ties to one's school carries with it distinct consequences depending on the pathway followed.

### *3.2.3 Social Relationships*

In general, collective pathways in the transition to high school are characterized by the maintenance of social relationships while divergent pathways involve a disruption of these ties. As shown with Figure 3.1 and Table 3.1, the stable, uniform pathway likely involves one middle school feeding to one high school. Therefore, there is much maintenance of social ties in the transition to high school, and consequently little

opportunity for new social relationships within the incoming class. Because Add Health and AHAA span across several cohorts, I was able to explore the stability of these pathways. While the pathways taken by students vary slightly from year to year within a single middle school, the contribution of middle school students to the high school in AHAA remains relatively stable between cohorts. This is particularly relevant for the stable, uniform pathway when thinking about social relationships. Not only is there very little opportunity for making new social ties within the incoming high school class, it is likely that incoming students are familiar with older students as well, having attended middle school with some of them and perhaps have older siblings attending the same high school. In contrast, the stable, mixed pathway involves a similar maintenance of social ties as students' transition to high school, but a very different social reality upon entering high school. Students in this collective pathway contribute, on average, to less than half of the incoming class. This presents a much greater opportunity for establishing new social relationships upon entering high school than the stable, uniform pathway. Therefore, the dynamic of the social groups involved in the transition is distinct (Simmel 1902), and hinges on this opportunity for the creation of new social relationships at the receiving school.

For the two divergent pathways in the transition to high school, social ties are largely disrupted. It is important to clarify that "maintenance" and "disruption" do not necessarily carry with them positive or negative connotations in terms of their consequences. Again, the impact of maintenance or disruption of social relationships has been shown to vary according to the context with which they occur (Wheaton 1990;

George 1993; Kinney 1993). Among students following the collective transition to high school, the maintenance of supportive social ties may promote academic achievement in the new school. However, as previous research has found, benefits of maintaining the status quo from one institution to the next as a positive element of the transition is relative. If students have a low social or academic status in middle school and this status is carried with them as they transition to high school, maintenance of social ties could be harmful and exacerbate vulnerabilities (Schiller 1999). The same distinction can be hypothesized for students following dispersed pathways. While middle school students in these cases certainly diverge from the main feeder pattern for their district, this deviation is not necessarily hypothesized to carry with it a negative impact on the student. It is the case that these students enter high school on the periphery socially, presumably when their receiving school may have another middle school as its dominant feeder. On the other hand, solitary transitions often imply individual agency, which is less hindered in a system with more choice. In these cases, a "clean slate" is possible for students following a solitary transition where previous reputations may be shed.

### *3.2.4 Dimension of Social Relationships*

As mentioned in Chapter 1, social relationships are generally considered to promote academic achievement within the confined social system characteristic of schools. However, effects of social ties must be carefully reconsidered in the context of school transitions. Certain ties are carried with students, such as those with peers while others are always severed, such as those with teachers. Yet, as alluded to by Figure 3.1, the maintenance, disruption and general reconfiguration of social relationships is distinct

for students following different pathways. Therefore, even the meaning of social ties during this disruption may not be the same between institutional pathways.

This study considers two main types of social relationships in the transition to high school—affective and institutional. Affective ties are characterized by social-psychological bonds between individuals involved in the same social system, of which relationships with teachers and peers comprise the core people with whom students interact daily and with whom distinct transformations of their relationship occurs during school change. Relationships with teachers are all but severed, while those with peers are maintained to a greater or lesser degree depending on what institutional pathway is followed. Institutional ties, such as involvement in extracurricular activities, are not necessarily linked to a specific set of social relationships. Therefore, they may be an avenue of integration into the social system of the high school.

Again, the meaning of social ties is likely to differ depending on the institutional pathway followed in the transition to high school. Among the collective pathways, popular students and those with more friends among classmates may flourish in the new high school as they more or less retain their status. These same popular students may flounder if they follow a divergent pathway. Those bonded with their middle school teachers may also do better in a more stable transitioning pathway, as vertical teaming is more likely to be in place and a continued positive relationship with teachers can develop. On the other hand, extracurricular involvement may serve students well despite their pathway, as they are based less on affective ties and more on institutional connections.

The first analytic chapter, Chapter 4, analyzes differences for academic outcomes between the four institutional pathways in the transition to high school. I explore how the dimensions of social ties discussed above affect student adjustment and whether this varies by the pathway followed given different levels of disruption. This helps further understanding regarding the impact of following different pathways. In addition, this chapter establishes patterns of academic outcomes and disruption of social relationships for each of the four pathways. This provides a baseline from which to build concerning where students begin high school, which is a crucial period in their academic trajectory.

## 3.3 Differences within Collective Pathways

As discussed above, the two collective pathways in this study are the stable, uniform pathway and the stable, mixed pathway in the transition to high school. These pathways are defined not only by differences in school size and urban location, but also by the opportunity of making new social ties upon entering high school. For the former, there is very little opportunity to make new friends among students in the same grade while the latter pathway is coupled with stability within the middle school cohort yet an opportunity to establish new social relationships upon entering high school.

### *3.3.1 Social Opportunity*

Chapter 1 discusses schools as confined social systems, where informal processes such as the normative structure of social relationships and social climate of schools potentially affects the academic adjustment of incoming students. This concept grounds analyses comparing the two collective pathways. As with the disruption or maintenance of social ties, relative opportunity for making new friends among the incoming cohort of

high school students may have positive or negative consequences from the perspective of individual students transitioning into that high school. For example, among the two collective pathways, the "uniform" pathway is generally more homogenous in terms of contributing feeder schools as well as composition of student body. Social status in this pathway likely remains more or less intact because the social system of the incoming cohort stays the same. Therefore, having less opportunity promotes maintenance of social status between middle school and high school, where those with higher status remain so—as do students with low status among classmates. Alternatively, the mixed pathway provides more opportunity for creating new social ties, during which status may be realigned.

Chapter 5 compares the two collective institutional pathways. Previous research shows that low status students benefit from more divergent transitions in the transition to high school. But what happens to low status students when they transition with the collective? Low status students—i.e., those who are socially more isolated, less involved and/or have lower academic performance in middle school—are expected to fare better academically when they follow a mixed pathway, where there is more social opportunity at their receiving high school. Comparing these two collective pathways also addresses selection issues. The collective pathway is characterized by students largely following the established path through the system of education. They are being processed by the system in more or less traditional ways. Yet by assessing which students are vulnerable in this system, and which are not, I underscore the differential experiences students have in schools as they are aligned and realigned during school transitions.

### 3.4 Differences within Divergent Pathways

The final analytic chapter of this study compares types of divergent pathways. Two of these pathways are discussed above in the transition to high school—solitary and dispersed. These students diverge from the normative the feeder pattern to high school, yet still follow the traditional structure of the school system where a school change occurs after graduating from the previous school.[12] Therefore, while the disruption of social relationships is a prominent characteristic of their transition, they still enter high school with other students who also are new to the institutional environment. In addition, many schools have specific programs designed to ease the transition to high school for incoming students where they are paired with an older "buddy" and, at a minimum, have an orientation (Reyes et al. 1994). The hypothesized advantage to this type of transition, albeit perhaps more disruptive in terms of academic expectations and structure of daily school life, is that communication between institutions is more established and decisions about course placement and acceptance of prior course credit are commonly made (Anderson 2005).

Thus far, the two divergent pathways in the transition to high school—solitary and dispersed—have been considered separately for descriptive purposes. Preliminary multivariate analyses explored whether associations between these pathways and academic outcomes differed. They did not. This is likely a remnant of the sampling design, as those following a "solitary" pathway were defined as such because they

[12] Eighty-five of those following a solitary transition do so from a grade-inclusive school. Therefore, they are not technically changing schools after the final grade of that school. However, this is a small number of students and they do enter high school together with a new cohort.

transitioned to high school with no other *sampled* respondents. Whether or not there are distinctions between these two types of divergent institutional pathways remains an empirical question that is left to analyses either utilizing a census approach or qualitative research. In multivariate analyses for this study, I combine the two divergent pathways in the transition to high school.

Chapter 6 compares the divergent pathways in the transition to high school with students who transfer during high school. As noted in Chapter 1, it is difficult to pinpoint processes of educational disruption for all divergent students since they are often associated with other disruptive forces such as residential mobility. This is especially the case with high school transfers. By comparing two divergent pathways that differ by timing of transition with reference to the structure of schooling, it may be easier to isolate institutional factors shaping their academic consequences. In other words, is it easier for students to diverge when doing so because of a structured school change? Are there additional disadvantages associated with transferring because it occurs outside of a structured school change? Analyses investigate academic outcomes at the end of high school, which also addresses whether patterns found for divergent students in the transition to high school persist by the end of high school.

### *3.4.1 Demographic and School Characteristics*

As with comparisons between pathways in the transition to high school, it is important to first establish differences between groups following divergent pathways. Table 3.3 shows selected descriptive statistics for these students, as well as for the overall

analytic sample and for either students who transition to high school with the collective or "stayers"—those who do not transfer during high school.

Table 3.3 shows descriptive statistics for students following the divergent pathways, compared with those who either transition with the collective or remain at the same high school throughout their high school career. The two divergent pathways, shown in the third and fifth columns, are not that different from the overall sample in terms of sociodemographic student characteristics and last school attended characteristics except in a few instances. As discussed above, the divergent pathway in the transition to high school has more minority students—but this is not the case with transfer students. However, both divergent pathways experience more disruption in terms of family structure change and mobility. Also, they attend schools in urban areas at much higher rates than the sample—and their cohort comparisons.

*3.4.2 Social Relationships*

By first understanding the sociodemographic and patterns involved among students following a divergent pathway, it becomes easier to speculate on the implications these types of school changes have on students' social relationships built in schools. Above, I discussed implications of social relationships concerning the transition to high school. Students following a solitary or dispersed institutional pathway experience the disruption of social relationships and opportunity for new social ties to a greater degree than those following the collective pathways to high school.

But what about transfer students? These students are traditionally conceptualized as most at-risk in the school system, particularly in elementary school. However, research

on the damaging nature of transferring during high school is mixed, and varies depending on which academic outcome is used (Pribesh and Downey 1999; Lee and Burkam 1992). At least in the sociodemographic and school characteristics shown in Table 3.3, these students do not appear to be drastically different from their peers in other divergent pathways. For example, the proportion of transfer students attending a Title I school is only .12, compared with .18 for the divergent transition to high school. Of course, these conclusions can only be considered superficial for two reasons. First, students in the divergent middle school transition and transfer pathways have more missing school data than the other students for reasons discussed in section 3.2.2. Second, there are many potential differences of transfer students that are not displayed in Table 3.3 that likely hinge on the disruption of social relationships.

Transfer students change school for a reason other than graduation. Partly because these students are difficult to follow, there is little longitudinal data on transfer students that explores *why* the transfer was made. A family structure change and consequential residential move are the most obvious reasons. The other reasons point to some facet of students' social relationships. For example, students may transfer due to expulsion or behavioral problems—or simply because they are alienated within the social climate and normative structure of their high school.

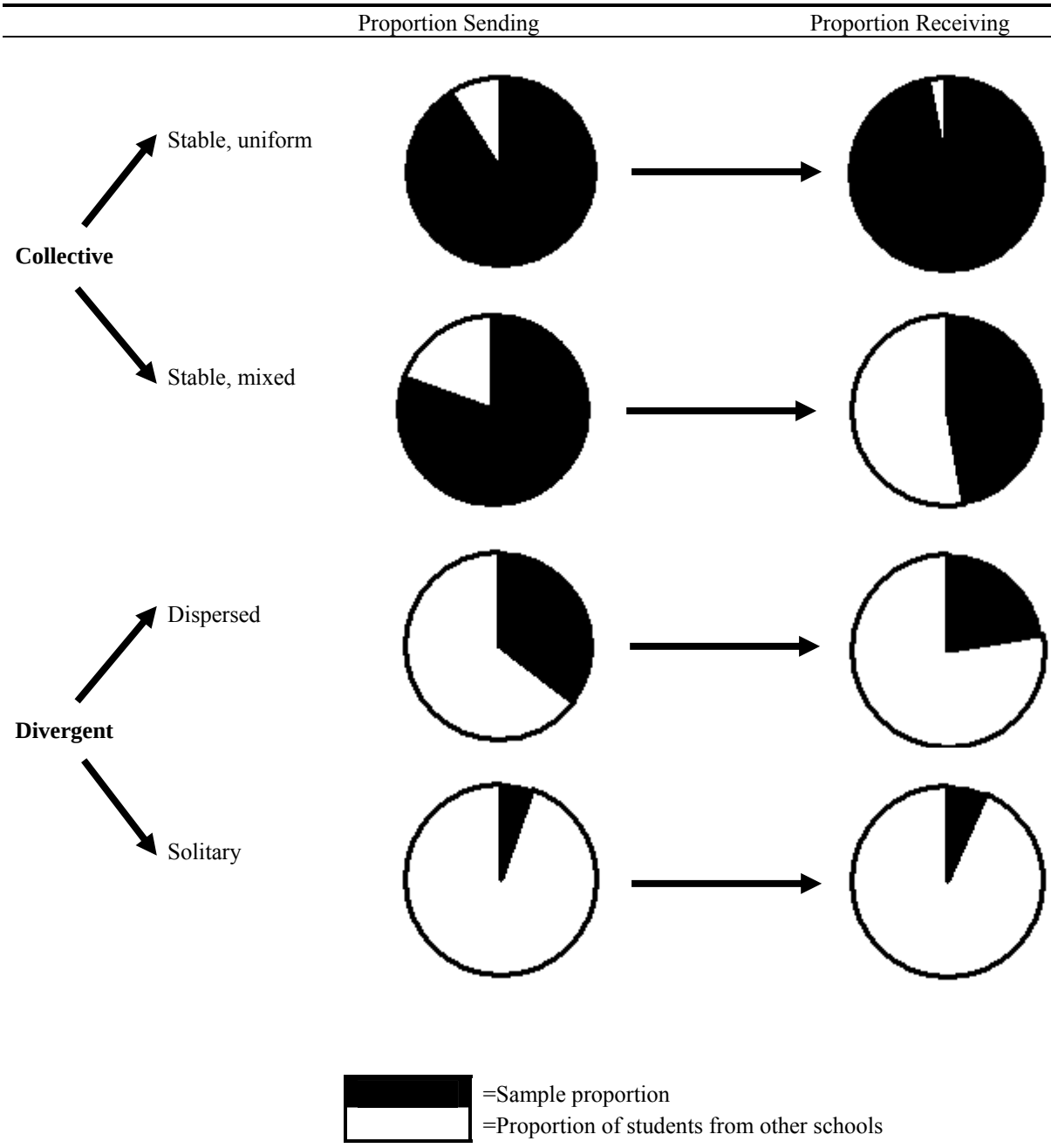
In the final analytic chapter, I investigate differences between the two divergent pathways by analyzing end of high school academic outcomes. This addresses whether consequences found for those following a divergent pathway in the transition to high school persist by the end of high school. In addition, comparisons between divergent

pathways indirectly address the institutional role concerning effects of school changes on the academic trajectory of divergent students. General expectations are such that students who transfer will have an additional vulnerability since this is not a structured school change.

### 3.5 Contributions of Institutional Pathways

A crucial element of the consequences of student transitions is that students follow different pathways that are characterized by varying amounts of disruption. In addition, a fundamental tenet of this study is that school transitions are the movement of individuals between institutions which allows a window of insight into processes of student alignment and realignment as they move through the educational system. Conceptualizing transitions this way contributes to understanding students' educational trajectory during adolescence. First, as analyzed in Chapter 4, social relationships made and broken affect integration into the new institutional environment. Second, as analyzed in Chapter 5, the social opportunity at the receiving institution can affect individual adjustment. Finally, as analyzed in Chapter 6, divergent transitions that occur outside of the institutional structure may have distinct meaning for overall trajectory through school, compared to divergent pathways in the transition to high school.

Figure 3.1 Institutional Pathways in the Transition to High School




Source: National Longitudinal Study of Adolescent Health (Add Health) and the Adolescent Health and Academic Achievement (AHAA) study

Table 3.1 Selected Weighted Descriptive Statistics of Middle School Students, by Institutional Pathway in the Transition to High School

| | Mean (SD) | | | | |
|---|---|---|---|---|---|
| | Total sample | Stable, uniform | Stable, mixed | Dispersed | Solitary |
| Proportion middle school classmates | .67 | .91 | .80 | .33 | .06 |
| Proportion incoming class | .68 | .99 | .47 | .21 | .12 |
| Female | .49 | .50 | .47 | .48 | .48 |
| Race/ethnicity | | | | | |
| Non-Latino White | .68 | .77 | .68 | .53 | .55 |
| Asian-American | .04 | .02 | .03 | .06 | .06 |
| Latino/a | .04 | .02 | .07 | .07 | .05 |
| African-American | .15 | .13 | .13 | .20 | .23 |
| Other race/ethnicity | .09 | .06 | .09 | .14 | .11 |
| Parents' level of education | 6.11 (2.49) | 6.16 (2.47) | 6.27 (2.28) | 5.85 (2.86) | 5.93 (2.47) |
| Family structure | | | | | |
| Both biological parents | .60 | .62 | .59 | .58 | .56 |
| Parent-stepparent | .16 | .14 | .18 | .16 | .18 |
| Single mother | .19 | .19 | .18 | .20 | .20 |
| Other family structure | .05 | .05 | .05 | .06 | .06 |
| Other disruptions (between waves) | | | | | |
| Family structure change | .11 | .10 | .09 | .11 | .16 |
| Recent transfer | .06 | .06 | .06 | .05 | .11 |
| Recent move | .05 | .04 | .04 | .04 | .10 |
| Type of middle school | | | | | |
| Elementary (e.g., K-8) | .08 | .04 | .18 | .12 | .04 |
| Middle (e.g., 6-8) | .68 | .61 | .65 | .74 | .64 |
| Middle school ends in 9th grade | .06 | .06 | .09 | .07 | .10 |
| Grade-inclusive (e.g., 7-12) | .18 | .29 | .08 | .07 | .22 |
| N | 3,044 | 1,315 | 832 | 514 | 383 |

Table 3.2 Selected Student Level School Descriptive Statistics, by Institutional Pathway in the Transition to High School (continued on the next page)

| | Mean (SD) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total sample | | Stable, uniform | | Stable, mixed | | Dispersed | | Solitary | |
| Sending school | | | | | | | | | | |
| School sector | | | | | | | | | | |
| Public | .93 | | .98 | | .93 | | .85 | | .90 | |
| Private | .07 | | .02 | | .07 | | .15 | | .10 | |
| Urban location | | | | | | | | | | |
| City | .32 | | .12 | | .42 | | .59 | | .45 | |
| Suburban/city fringe | .30 | | .29 | | .33 | | .31 | | .30 | |
| Town | .18 | | .29 | | .11 | | .04 | | .11 | |
| Rural | .20 | | .30 | | .14 | | .06 | | .14 | |
| Proportion students free lunch eligible | .29 | (.19) | .28 | (.19) | .28 | (.20) | .30 | (.18) | .31 | (.19) |
| Proportion minority students | .36 | (.34) | .30 | (.32) | .35 | (.35) | .44 | (.30) | .44 | (.34) |
| School size | 764.31 | (387.02) | 750.54 | (387.44) | 817.49 | (411.63) | 765.18 | (293.88) | 766.62 | (395.77) |
| Choice set of sending school | | | | | | | | | | |
| No choice | .50 | | .74 | | .33 | | .22 | | .34 | |
| Private only | .15 | | .06 | | .22 | | .24 | | .14 | |
| Public only | .23 | | .18 | | .23 | | .31 | | .30 | |
| Both public & private | .13 | | .01 | | .22 | | .23 | | .22 | |
| Proportion of students who exercise choice | .23 | (.32) | .09 | (.22) | .33 | (.33) | .37 | (.33) | .30 | (.28) |
| Missing data | .00 | | .00 | | .00 | | .00 | | .00 | |

Table 3.2 Contd. Selected Student Level School Descriptive Statistics, by Institutional Pathway in the Transition to High School

| | Mean (SD) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total sample | | Stable, uniform | | Stable, mixed | | Dispersed | | Solitary | |
| Receiving school | | | | | | | | | | |
| School sector | | | | | | | | | | |
| Public | .95 | | .98 | | .92 | | .93 | | .91 | |
| Private | .05 | | .02 | | .08 | | .07 | | .09 | |
| Urban location | | | | | | | | | | |
| City | .37 | | .12 | | .50 | | .65 | | .56 | |
| Suburban/city fringe | .27 | | .29 | | .27 | | .28 | | .24 | |
| Town | .19 | | .29 | | .15 | | .04 | | .11 | |
| Rural | .17 | | .30 | | .10 | | .03 | | .09 | |
| Proportion free lunch eligible | .22 | (.16) | .24 | (.19) | .21 | (.13) | .19 | (.11) | .22 | (.14) |
| Proportion minority students | .32 | (.31) | .27 | (.31) | .35 | (.31) | .40 | (.28) | .35 | (.29) |
| School size | 1187.30 | (687.77) | 898.94 | (436.40) | 1574.10 | (838.60) | 1378.99 | (613.20) | 1079.90 | (636.46) |
| Special type public school | | | | | | | | | | |
| Magnet school | .02 | | .00 | | .04 | | .02 | | .03 | |
| Title I school | .12 | | .09 | | .11 | | .19 | | .17 | |
| Missing data | .01 | | .00 | | .00 | | .02 | | .08 | |

Table 3.3 Weighted Descriptive Statistics Comparing Divergent Institutional Pathways with Students who Transition with the Collective and Stayers (continued on next page)

| | | | Middle School Cohorts | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total sample | | Collective | | Divergent | | Stayers | | Transfers | |
| Student characteristics | | | | | | | | | | |
| Female | .50 | | .49 | | .48 | | .51 | | .47 | |
| Race/ethnicity | | | | | | | | | | |
| Non-Latino White | .66 | | .74 | | .54 | | .64 | | .63 | |
| Asian-American | .04 | | .03 | | .06 | | .04 | | .04 | |
| Latino/a | .05 | | .04 | | .06 | | .05 | | .04 | |
| African-American | .16 | | .13 | | .21 | | .16 | | .18 | |
| Other race/ethnicity | .09 | | .06 | | .13 | | .11 | | .11 | |
| Parents' level of education | 6.07 | (2.33) | 6.20 | (2.40) | 5.89 | (2.70) | 6.02 | (2.19) | 6.11 | (2.29) |
| Family structure | | | | | | | | | | |
| Both biological parents | .59 | | .61 | | .57 | | .59 | | .50 | |
| Parent-stepparent | .16 | | .15 | | .16 | | .15 | | .21 | |
| Single mother | .19 | | .19 | | .21 | | .17 | | .16 | |
| Other family structure | .06 | | .05 | | .06 | | .07 | | .13 | |
| Other disruptions (between waves) | | | | | | | | | | |
| Family structure change | .10 | | .09 | | .12 | | .10 | | .14 | |
| Recent transfer | .05 | | .05 | | .07 | | .04 | | .09 | |
| Recent move | .05 | | .04 | | .07 | | .05 | | .10 | |
| N | 7,250 | | 2,147 | | 897 | | 3,792 | | 414 | |

Table 3.3 Contd. Weighted Descriptive Statistics Comparing Divergent Institutional Pathways with Students who Transition with the Collective and Stayers

| | | | Middle School Cohorts | | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total sample | | Collective | | Divergent | | Stayers | | Transfers | |
| School characteristics | | | | | | | | | | |
| School Sector | | | | | | | | | | |
| Public | .94 | | .96 | | .92 | | .94 | | .92 | |
| Private | .06 | | .04 | | .08 | | .06 | | .08 | |
| Special type public school | | | | | | | | | | |
| Magnet school | .03 | | .01 | | .04 | | .02 | | .01 | |
| Title I school | .12 | | .09 | | .18 | | .11 | | .12 | |
| Urban location | | | | | | | | | | |
| City | .31 | | .23 | | .59 | | .28 | | .58 | |
| Suburban/city fringe | .33 | | .33 | | .27 | | .35 | | .19 | |
| Town | .17 | | .23 | | .08 | | .18 | | .10 | |
| Rural | .18 | | .20 | | .06 | | .19 | | .13 | |
| Proportion free lunch eligible | .30 | (.16) | .25 | (.18) | .36 | (.14) | .30 | (.14) | .29 | (.12) |
| Proportion minority students | .26 | (.30) | .22 | (.32) | .20 | (.32) | .22 | (.30) | .20 | (.23) |
| School size | 1007.86 | (736.91) | 1125.78 | (781.84) | 1171.87 | (670.42) | 1285.28 | (727.52) | 1002.75 | (616.86) |
| Missing school data | .00 | | .00 | | .05 | | .00 | | .10 | |
| N | 7,250 | | 2,147 | | 897 | | 3,792 | | 414 | |

# CHAPTER 4: SOCIAL RELATIONSHIPS, ACADEMIC ADJUSTMENT & PLACEMENT IN THE TRANSITION TO HIGH SCHOOL

## 4.1 Introduction

The institutional pathways followed by students in the transition to high school are characterized by maintenance and disruption of social relationships. Transitions disrupt social ties that promote academic success (Coleman 1987). Therefore, school transitions can be a social and academic turning point for students—providing opportunities or, alternatively, exacerbating students' vulnerabilities (Schiller 1999; Swanson and Schneider 1999; Kinney 1993). Students who are academically and socially successful in the transition to high school are better prepared for the challenges facing them throughout their high school years. Academically, student achievement in the first year of high school impacts future academic trajectory and integration into school (Stevenson et al. 1994).

In this chapter, I analyze differences in academic performance and persistence in the first year of high school among institutional pathways followed by students in the transition to high school. Students' academic performance, measured by their Grade Point Average (GPA) in the first year of high school is an indication of academic adjustment in the new institution. Course placement, measured as on-track to complete Algebra II (e.g., Algebra I for 9$^{th}$ graders in their first year of high school), provides information on students' starting point for coursework in high school. Since math courses are a more hierarchical of curricular course sequence, they are a useful indicator for

opportunity to learn. Social relationships left behind constitute an important mechanism of academic adjustment in this transition (Schiller 1999), and may even affect course placement (Baker and Stevenson 1986). As mentioned, I consider whether relationships characterized by affective attachment impact students differently than those initiated within the institution, such as extracurricular involvement.

### 4.2 Hypotheses

*Hypothesis 1: Social relationships will affect students' academic outcomes after the transition to high school, but their impact will be contingent on the pathway followed.* Social relationships are a large part of success in school that get reconfigured when students change schools and are expected to affect academic outcomes after the transition to high school. As evidenced by the four main institutional pathways followed by middle school students in Add Health highlighted in Chapter 3, the amount of disruption of these ties varies. While it is the case that relationships are transformed during any change of schools (Pribesh and Downey 1999), transitioning along with middle school classmates could provide vital social support as students enter high school, impacting their initial academic adjustment and later educational trajectory. In more stable transitions where most of the middle school class enters the same high school (stable, uniform), remnants of students' middle school academic and social status are likely carried with them to high school. For example, students with higher academic status in their middle school benefit from a more stable transition (Schiller 1999). Stable transitions offer social support of classmates from the sending school as the school environment becomes less personalized with increased demands (Reyes et al. 1994). Supportive relationships in school promote

social capital that can be leveraged to increase academic achievement and persistence (Coleman 1987), but these relationships are intensely related to student transitioning patterns. Divergent transitions may create opportunities for new social relationships and can give adolescents more freedom to explore their identities (Kinney 1993; Aikins et al. 2005; Seidman and French 2004).

*Hypothesis 2: Social relationships characterized by affective attachment will have a greater impact on students' academic outcomes than those initiated within the institution.* As transitioning pathways are not the same, dimensions of social relationships that connect individuals to their school are likely to have a different impact on students during school transitions. I consider two critical dimensions of social relationships built in school. The first encompasses affective attachments (Croninger and Lee 2001; Rosenfeld et al. 2000). Bonds with middle school teachers, perhaps the most useful to students because teachers can be considered institutional agents (Stanton-Salazar and Dornbusch 1995), are also the relationships that change most dramatically during school transitions (Roeser et al. 1998; Reyes et al. 1994; Midgley et al. 1989a). In addition, peer relationships fluctuate in complex ways during normative school transitions as some friends are left behind and the opportunity for new friendships occurs (Cantin and Boivin 2004; Seidman et al. 1994). Status among peers—or popularity—is especially crucial during this developmental period (de Bruyn and van den Boom 2005). Popularity remains established among peers following a more stable transition but needs to be renegotiated among students in disrupted transitions. The second dimension of social relationships encompasses institutionally-based relationships. Extracurricular involvement is an

institutionally-driven avenue for creating social relationships within schools, and, as such, may more easily convey to a new institutional context (Eccles 1999; Goldstein et al. 2005; Mahoney 2000).

### 4.3 Sample Characteristics and Analytic Plan

The main analytic sample used in this chapter is middle school students who transition to high school. This includes adolescents in 7th, 8th and some 9th graders in Wave I of Add Health. Ninth graders are included if they attend one of the three middle schools that includes a 9th grade. Table 4.1 displays selected means of measures at each major stage of sample attrition. This table shows that the largest change in sample means due to attrition occurs for the first filter, which limits the sample to only middle school students. Though the means are not largely different, the middle school student sample includes more females, white students, higher average level of parents' education and higher middle school GPA. Once the first filter is applied, the additional two filters do not change the sample much more.

Analyses for this chapter are first conducted with all middle school students together. Then, to allow the effects of students' middle school integration to vary (see Schiller 1999; Coleman, Kilgore, and Hoffer 1982 for an example), each of the four institutional pathways are modeled separately. These separate models do not necessarily indicate differences in magnitude of significance, but they help understand how measures of social relationships may function differently for students following that pathway. Each set of analyses examining the institutional pathways separately is comprised of two models. First, students' academic outcomes in the first year of high school, GPA and

math course placement, were predicted in models including all controls listed above, as well as middle school social relationships. These analyses also initially included a recent move, which was not statistically significant in any models and for parsimony was removed from final models. Other measures of disruption, such as recent transfer and/or family structure change were retained in final models. The second set of models include interaction terms discussed in Chapter 2—pathway and middle school GPA, as well as middle school GPA and social relationships. Due to the smaller sample sizes for some pathways, models report significance levels including $p<.10$. While only considered marginally significant, these coefficients are still considered to have meaning and inform patterns, particularly among the stable, mixed and two divergent pathways. Pooled models explored differences between pathways on dimensions of social ties by testing interaction terms between pathway (reference= stable, uniform) and teacher bonding, popularity, and extracurricular activities. None of these interactions were statistically significant. Therefore, differences in results of separate models do not necessarily indicate a statistical differences between pathways. Rather, these models point to which social ties are most salient for students following each pathway.

First I present binary descriptive statistics for the analytic sample and highlight differences between pathways. Then, results from Ordinary Least Squares (OLS) regression analyses predicting GPA are discussed, followed by results from logistic regression analyses predicting normative math course placement. Since some students transition to high school in $10^{th}$ grade, this is measured as Geometry or higher, while for students who begin high school in $9^{th}$ grade, this is measured as Algebra I or higher.

Additional analyses also tested whether patterns for students who began high school placed in math courses higher than Algebra I and there were no major differences in findings between groups so they are included in one category.

As discussed in Section 2.4.1, the dichotomous measure for math course taking represents the normative math course placement at the beginning of high school for Add Health respondents and also reflects national rates. For 8$^{th}$ graders transitioning to high school in 9$^{th}$ grade, being placed in pre-Algebra or remedial math signifies beginning high school at a positional disadvantage from a curricular perspective, resulting in lesser opportunity to learn while in high school. Bivariate statistics indicate that only a third of students in this study who begin high school below Algebra I in their math course taking reach Algebra II by the end of high school, while 80% of students starting in Algebra I or higher reach this gate-keeping course. Modal math course taking in the first year of high school was investigated within original Add Health sampled high schools. In four of these schools the modal math course placement was lower than Algebra I. Results do not differ from those presented here either when a flag (non-significant) for these schools is included nor when these schools are removed from analyses. However, variation in course taking between schools does underscore that school level analyses will likely produce interesting differences, as will be discussed in Chapter 7.

Together, these academic outcomes provide a general indication of students' making a more or less successful transition to high school. Those who perform well academically can be considered as adjusting well to their new high school environment, which includes understanding teachers' expectations and putting forth the effort required

of them. Those who are placed in Algebra I or higher (or Geometry or higher depending on the grade structure of the transition) are poised to complete Algebra II by the end of high school. This is a crucial indicator of school engagement and adequate progress in the sense that reaching Algebra II strongly predicts postsecondary attendance.

**4.4 Results**

Table 4.2 displays descriptive statistics of the analytic sample for measures used in Chapter 4, and includes notation of statistically significant differences in means for each of the four institutional pathways in the transition to high school from the sample mean. Much shown in Table 4.2 is similar to descriptive statistics discussed in Tables 3.1 and 3.2, such as differences in race/ethnic makeup of the institutional pathways, as well as urban location and high school size. Differences between social relationship measures seem to also indicate distinct realities of students' connection to the people in their schools as they face a school transition. Students following a stable, uniform pathway report the highest average levels of middle school affective attachment—teacher bonding and popularity—while those following a divergent pathway report the lowest levels. While those in divergent pathways have the lowest rates of extracurricular involvement, the differences between the mean levels of involvement are small and not statistically significant. The differences in social relationships in Table 4.2 illustrate that social ties could be more salient for students in stable pathways whereas those with more disruption in their transition to high school may experience consequences from having weaker ties to their school. Bivariate results indicate that affective ties in particular may have

different meaning for the most stable and most divergent pathways in the transition to high school.

We now turn to the multivariate analysis, which first explores whether middle school social relationships affect students' academic adjustment in high school. This is done by predicting GPA and math course placement in the first year of high school for all middle school students. Table 4.3 shows regression coefficients from models predicting GPA in the first year of high school. First, students following a stable, mixed pathway earn higher first year GPAs compared to those following a stable, uniform pathway. Students following a divergent pathway also receive a boost in first year GPA, though statistical significance is marginal ($p<.10$). More popular students and those who were more bonded with teachers earn higher GPAs during their first year of high school as well. Finally, students highly involved in middle school extracurricular activities receive a higher predicted GPA after the transition to high school.

Analyses with the entire middle school sample also explored interactions between students' middle school social relationships and the pathway to high school. High achieving middle school students who follow a divergent pathway in the transition to high school receive a lower first year GPA than their peers who follow the two collective pathways ($b = -.15$). This suggests that students with a high academic status in middle school have a more difficult time adjusting academically in the transition to high school when diverging to high school with fewer classmates.

Table 4.4 shows results from analyses where institutional pathways are considered separately. Analyses presented in these tables explore whether the impact of

middle school social relationships on students' academic adjustment in high school is contingent upon the pathway followed to high school, and if dimensions of social relationships affect students differently.

For the stable, uniform transition, models indicate that middle school social relationships may promote higher academic achievement at the beginning of high school. Higher levels of affective attachment are beneficial to these students' GPAs after the transition to high school, as found in Table 4.3. Similarly, students involved in extracurricular activities also earn higher GPAs, though this is marginally statistically significant. In the reduced models, extracurricular involvement is highly statistically significant before including measures of affective attachment. While institutional involvement is an important aspect of students' academic performance after making a school transition, affective ties seem to explain part of why these institutional ties are important for academic adjustment in the stable, uniform pathway. Model 2 includes interactions of middle school academic achievement and social relationships, which indicates no additional advantage for high achievers along the dimensions of social relationships. Students who experience a family structure change between waves tend to get lower GPAs. These students seem to have a more difficult time after a family structure change only when transitioning in stable, uniform pathways. Tests of interactions in pooled models show the difference between the pathways is only statistically significant between those following a stable, mixed and a stable, uniform pathway. This might occur because these students are experiencing a family structure change in typically smaller communities with more tight-knit social systems, details of

their family life are more well-known to others, making a disruption in family structure more difficult for students.

Like their counterparts following a stable, uniform transition to high school, those following a stable, mixed transition seem to benefit from bonds with teachers, giving students who report higher teacher bonding a boost in GPA in their first year of high school. Model 2 illustrates that high status adolescents receive an additional boost in first year GPA among students in the stable, mixed pathway ($b$ = .02). In other words, students following the stable, mixed pathway who are both popular among classmates and have higher academic achievement benefit academically in the first year of high school.

In addition, those involved in middle school extracurricular activities receive a lower first year GPA ($b$ = -.20). Further investigation of predicted probabilities reveals differences between students with low or average academic performance in middle school and those with high academic performance. It is only students who have high middle school GPAs and are involved in extracurricular activities who earn a lower predicted GPA than their peers who are not involved in extracurricular activities (3.83 vs. 3.96). Among academically average or low middle school students, those also involved in extracurricular activities earn higher GPAs than their less involved peers in the stable, mixed pathway.

It is also interesting to note that adolescents following a stable, mixed pathway in urban areas receive lower first year GPAs while those in smaller towns are earn a higher first year GPA when compared to those in suburban areas. This may be due to

unmeasured differences in mixed pathways according to geographic location related to consistency of social ties. Smaller towns have a set district structure, where students transition to a high school that a few other middle schools feed into. As noted in Chapter 3, magnet school attendance overall is small, but occurs disproportionately more often among students in the stable, mixed pathway. Additional analysis reveals that all students who attend magnet schools in this pathway do so in urban areas. Therefore, the lower GPA may be due to increased academic competition in the receiving high school among urban students.

Those who recently transferred into their middle school and follow a stable, mixed pathway have a predicted boost in first year GPA. A recent transfer student may be more readily prepared for a new institutional environment as they transition to high school because they have had to address school change recently. Furthermore, recent transfer students may particularly thrive in the stable, mixed pathway because of the duality of maintaining social ties yet opportunity to make new friends as well.

Finally, Table 4.4 shows results predicting first year GPA for students following a divergent pathway in the transition to high school. Those with more friends in middle school earn higher GPAs in the first year of high school compared to their divergent classmates with fewer friends. This is not surprising given that social ties have been found to promote academic achievement—though it is particularly interesting that the helpfulness of social ties follows students even for students following a divergent pathway, which may tap into an ability of students with many friends in middle school to form new social ties regardless of the pathway followed. Those following the divergent

pathway who are involved in extracurricular activities receive a boost in first year GPA in preliminary models, before including affective ties. This again underscores that benefits from involvement in extracurricular activities may be an avenue for creating new affective ties and are therefore not associated with academic outcomes after including measures of bonding and popularity.

Table 4.5 shows results from models predicting math course placement after the transition to high school. While grades earned in the first year of high school are indicators of adjustment and performance according to teachers' expectations, course placement suggests students' progression through required coursework is more or less on-track, and reflects students' opportunity to learn as structured by their high school course taking. Here, popular students and those involved in extracurricular activities are more likely to take Algebra I in 9$^{th}$ grade or Geometry in 10$^{th}$ grade (depending on grade structure of the transition), which puts them on-track to complete Algebra II by the end of high school. In addition, high achieving middle school students following a divergent pathway are less likely than those following a collective pathway to be placed on-track in math. There is also some indication that those students who have high affective ties and high academic performance in middle school are more likely to be placed on-track for postsecondary attendance as well ($p<.10$).

As with GPA, I next analyzed the likelihood of on-track math course placement separately by the institutional pathway followed in the transition to high school. These results are shown in Table 4.6. For those following the stable, uniform pathway, students involved in extracurricular activities are more likely to be placed on-track ($b = .77$), as

are students who report both higher teacher bonding and higher middle school academic performance ($b$ = .32, Model 2).

Further analyses with predicted probabilities can aid in the interpretation of statistically significant interaction terms found in Table 4.6. First, students in the most stable pathway who are bonded with teachers *and* have an average or high middle school GPA are more likely to be placed in Algebra I or higher/Geometry or higher upon entering high school. These are higher achievers who get along well with their teachers and may also benefit from vertical teaming. However, for students with a lower middle school GPA in the more stable pathway, those who report being closer to their teachers are placed in the normative math course only 64% of the time while the predicted average for all students is 76%. This reveals an interesting element of measuring teacher bonding. Low achieving students with higher levels of teacher bonding are likely remedial students. In other words, the close affective ties with teachers are likely a result of needing special services, and not promotional of higher achievement per se. On the other hand, low achieving students reporting low teacher bonding may reflect the students' dislike of school either due to academically difficultly, conflicts with teachers, or both. Either way, teachers do seem to play a role in the academic adjustment of low achieving students.

Interestingly, those who were recent transfers into their middle school are more likely to be placed on-track in math among students following the stable, uniform pathway. Schools may place new students in the modal math course, particularly in systems with more vertical teaming between levels of schooling.

Results for students following the stable, mixed pathway show that those with more friends in middle school are also more likely to be placed on-track in math. Among those in the stable, mixed pathway, popular students who also have higher middle school academic achievement have an increased likelihood of on-track placement ($p<.10$).

In the divergent pathway, students involved in extracurricular activities are more likely to be placed on-track to complete Algebra II by the end of high school. Institutional engagement in the form of extracurricular activities for these students seems to translate into progression into nationally normative levels of math coursework at the beginning of high school. In addition, middle school students with high social and academic status following a divergent pathway are more likely to be placed on-track in math ($b = .12$).

While the focus above has been on what role social ties play in relation to academic outcomes among different institutional pathways, tables of multivariate models also illustrate some interesting sociodemographic differences. Because there were few differences in predicted sociodemographic effects between the two outcomes, results from both academic achievement and course placement are discussed together. As expected, students with parents who have higher levels of education earn higher GPAs after the transition to high school regardless of what pathway is followed. African-Americans receive lower GPAs than white students, also regardless of pathway followed. There are only a few instances where students' sociodemographic characteristics predict math course placement. Students following the most stable pathway who have parents with higher levels of education are more likely to be placed on-track in math. This suggests that schools may be internally stratified by college preparation curricula with

respect to social class. Another interesting, though not unexpected, difference between academic performance and placement occurs between boys and girls. Girls earn higher GPAs, but models indicate that they are generally less likely to be placed on-track in math though this is not consistently statistically significant. Additional analyses also explored interactions between race/ethnicity and gender in pooled models, none of which were statistically significant. Academic processes may be different for these groups depending on what pathway is followed, which is discussed as a future direction for this study in Chapter 7.

**4.5 Discussion**

This chapter addressed whether the reconfiguration of social relationships of each pathway in the transition to high school affect academic performance and placement in the first year of high school, and if this varies depending on the pathway followed. Results support the notion that students experience school transitions differently given the circumstances surrounding their transition (Rudolph, Lambert, Clark, and Kurlakowsky 2001), highlighting the particular importance of social relationships and institutional pathway followed as students transition to high school.

Results generally support the first hypothesis, that social ties will be related to academic outcomes after the transition to high school, contingent upon what pathway is followed. This is generally the case, but social relationships seem more salient for grades than for math course placement. Overall, all measures of affective attachment and institutional involvement included in models predict academic performance in high

school, but only popularity among classmates and extracurricular involvement predict math course placement.

Among students following a stable, uniform pathway, those with higher affective and institutional ties have higher first year GPAs. However, only some measures predict first year GPA for the stable, mixed and divergent pathways. Teacher bonding is perhaps one of the most salient connections for students to make within their school. Results support teacher bonding as important during the transition to high school as well, predicting a boost in GPA for students in the two collective pathways. In general terms, teacher bonding could be a proxy for overall integration and attachment to the system of education or represent an understanding of teachers' expectations for academic performance. Teacher bonding seems to play less of a role in math course placement in the first year of high school. Only high achieving students among those following a stable, uniform pathway who are also bonded with their middle school teachers have a greater likelihood of on-track math course placement. This is the only instance in which bonding with teachers seems to influence math course placement after the transition to high school. This may reflect vertical teaming in the most stable of pathways to high school, where middle school teachers influence course placement upon entering high school whereas in pathways with more disruption vertical teaming is less likely to occur.

Results regarding middle school student popularity present an interesting insight into potential reconfiguration of social ties in the transition to high school that are important for both academic achievement and math course taking in that first year of high school. As expected, popular students earn higher first year GPAs among those following

the stable, uniform pathway. For those in the stable, mixed pathway—which is characterized by an opportunity for new social ties as they comprise less than half of the incoming cohort—having more friends amongst classmates is only beneficial for academic achievement for those with high academic status in middle school as well. Interestingly, those who follow a divergent pathway also receive a boost in first year GPA if they are popular in middle school. This may be a function of individual personality and resiliency—an ability to socially integrate into the new institutional environment despite the disruption of social ties. Results regarding the impact of popularity amongst middle school classmates are similar for math course placement, except that among those following the divergent pathway, having more friends is only beneficial if students also have higher academic performance in middle school as well.

Extracurricular involvement, which was predicted to impact integration into high school regardless of pathway due to institutional rather than affective ties, seemed less salient for academic adjustment than placement. All students involved in extracurricular activities earn higher first year GPAs and are more likely to be placed on-track in math than uninvolved classmates. Results from models predicting math course placement that considered pathways separately reiterate the importance of extracurricular involvement for all students, with one exception. Those following a stable, mixed pathway do not appear to receive the same benefit from extracurricular involvement. High performing middle school students among those who follow a stable, mixed pathway earn a lower first year GPA than their classmates in the same pathway. This finding may stem from high achievers getting distracted from academics if they are too involved in

extracurricular activities, and become less able to keep up with their peers who may only be focusing on academics.

There is less evidence to support the second hypothesis, where I suggested that social relationships characterized by affective attachment will have a greater impact on academic outcomes than those initiated within the institution. On the one hand, social relationships characterized by affective attachment do seem to impact students' academic adjustment and placement in the transition to high school in one way or another in each institutional pathway followed, particularly for those with high academic status. This seems to indicate that students who are academically successful are also those who either form more affective ties in school and/or are those who are likely to benefit from such ties and from extracurricular involvement.

On the other hand, institutional ties such as extracurricular involvement yields mixed results. As expected, this institutional involvement benefits those following a stable, uniform transition. In addition, those following a divergent transition are more likely to be placed on-track in math than their less involved peers in the divergent pathway, but this is not the case for GPA. It may be that extracurricular involvement is operating as a measure of institutional consistency where involvement in activities taps into some integration into the system of education, which translates into normal academic progress as well. Other factors involving the attributes of this pathway may be at work as well. Given the institutional nature of the transition to high school, students following a divergent pathway must be considered a select group. Following this pathway is likely a result of individual agency, some other disruption, or even a system with expanded

choice. I address issues surrounding divergent pathways with further research in Chapter 6, which compares divergent pathways throughout high school.

This chapter illustrates that social ties—both affective and institutional—are highly salient for students as they transition to high school. Findings suggest that academically high performers in particular benefit from affective ties. In other words, those most integrated into the academic and social realms of school seem to have a relatively smooth transition to high school even regardless of pathway followed. There is one exception to this; high achieving students following a divergent pathway appear to have more difficulty in both performance and placement in the transition to high school.

Interactions between the pathway followed and students' middle school academic performance mirror previous research using the National Educational Longitudinal Study (NELS). As in Schiller's research (1999), I find that high achieving students who follow a divergent pathway have a more difficult time adjusting academically to high school than high achieving peers who follow more stable transitions. Though Add Health survey data do not include math course taking in middle school, the interaction between pathway and academic achievement in middle school does seem to indicate that high achievers benefit from the most stable transitions, where their status may be less likely to change along with the change of schools. Whether or not this difference in academic outcomes for the first year of high school persists until the end of high school is investigated in Chapter 6.

Finally, there is some indication that the meaning of social relationships fluctuates depending on what pathway is followed. In more stable transitions, social and academic

status exert influence on students in a way that does not occur when there is more disruption in the transition to high school. It appears that, when the social system of the middle school is more or less maintained in the transition to high school, social ties are the most salient. However, when there is stability from middle school yet social opportunity in high school—such as in the stable, mixed pathway—only high status students fare better academically. Differences between these stable pathways are further investigated in the next chapter.

Table 4.1 Selected Means from Sample Attrition

| | Mean | | | |
|---|---|---|---|---|
| | Sample 1[a] | Sample 2[b] | Sample3[c] | Analytic Sample[d] |
| Female | .53 | .55 | .55 | .55 |
| Non-Latino white | .54 | .59 | .59 | .58 |
| Living with both biological parents | .57 | .58 | .59 | .58 |
| Parents' level of education | 6.12 | 6.21 | 6.23 | 6.16 |
| Middle school GPA | 2.83 | 2.95 | 2.95 | 2.94 |
| N | 12,167 | 3,147 | 3,044 | 2,667 |

[a]Full Wave III education component with valid transcript sample.
[b]Included filter to Sample 1 for only Wave I middle school students.
[c]Included filter to Sample 2 for having a valid sample weight.
[d]Included filter to Sample 3 for having data on the dependent variables and from a school with friendship data.

Table 4.2 Weighted Descriptive Statistics of All Measures Used in Analyses, by Institutional Pathway

| | | | Institutional Pathways | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Sample | | Stable, uniform | | Stable, mixed | | Divergent | |
| Female | .49 | | .51 | | .46 | | .49 | |
| Race/ethnicity | | | | | | | | |
| Non-Latino white | .67 | | .77 [a] | | .70 | | .53 [a] | |
| Asian-American | .04 | | .02 [a] | | .04 | | .06 [a] | |
| Latino/a | .04 | | .02 [a] | | .03 | | .06 [a] | |
| African-American | .16 | | .13 [a] | | .14 | | .22 [a] | |
| Other race/ethnicity | .09 | | .06 [a] | | .09 | | .13 [a] | |
| Parents' level of education | 6.03 | (2.20) | 6.06 | (2.14) | 6.28 [a] | (2.00) | 5.81 [a] | (2.42) |
| Family structure | | | | | | | | |
| Both biological parents | .60 | | .62 | | .59 | | .57 | |
| Parent-stepparent | .15 | | .14 | | .17 | | .16 | |
| Single mother | .20 | | .20 | | .18 | | .21 | |
| Other family structure | .05 | | .04 | | .06 | | .06 | |
| Other disruptions | | | | | | | | |
| Recent transfer | .10 | | .12 [a] | | .06 [a] | | .09 | |
| Family structure change | .10 | | .09 | | .09 | | .12 [a] | |
| High school size | 1107.33 | (590.74) | 868.24 | (406.83) | 1472.80 | (645.77) | 1161.78 | (597.04) |
| Urban location | | | | | | | | |
| City | .29 | | .07 [a] | | .49 [a] | | .45 [a] | |
| Suburban/city fringe | .36 | | .37 | | .28 [a] | | .39 [a] | |
| Town | .19 | | .28 [a] | | .14 [a] | | .09 [a] | |
| Rural | .16 | | .26 [a] | | .09 [a] | | .07 [a] | |
| Private high school | .05 | | .02 [a] | | .08 [a] | | .08 [a] | |
| Middle school affective attachment | | | | | | | | |
| Teacher bonding | 3.78 | (.81) | 3.84 [a] | (.81) | 3.77 | (.75) | 3.71 [a] | (.86) |
| Popularity | 4.80 | (3.79) | 5.35 [a] | (4.36) | 4.59 | (3.22) | 4.17 [a] | (3.22) |
| Extracurricular involvement | .36 | | .36 | | .38 | | .35 | |
| Academic achievement | | | | | | | | |
| Middle school GPA | 2.91 | (.75) | 2.97 [a] | (.76) | 2.90 | (.70) | 2.86 [a] | (.77) |
| First year GPA | 2.56 | (.94) | 2.60 | (.96) | 2.64 [a] | (.85) | 2.45 [a] | (.99) |
| First year math Algebra I or higher | .70 | | .69 | | .71 | | .72 | |
| N | 2,667 | | 1,153 | | 731 | | 783 | |

*Note*. Standard deviations presented next to means. Statistics with a superscript "a" indicate the mean for this group is significantly different from the sample mean ($p<.05$).

Table 4.3 Ordinary Least Squares (OLS) Regression Coefficients and Standard Errors Predicting First Year GPA Among All Middle School Students

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | *b* | (SE) | *b* | (SE) |
| Female | .20*** | (.03) | .20*** | (.03) |
| Race/ethnicity (ref. = non-Latino white) | | | | |
| Asian-American | .16† | (.09) | .17* | (.09) |
| Latino/a | -.15 | (.11) | -.15 | (.11) |
| African-American | -.39*** | (.08) | -.39*** | (.08) |
| Other race/ethnicity | -.13 | (.07) | -.13* | (.07) |
| Parents' level of education | .07** | (.01) | .07*** | (.01) |
| Family structure (ref. = both biological parents) | | | | |
| Parent-stepparent | -.08 | (.05) | -.09 | (.05) |
| Single mother | .03 | (.05) | .03 | (.05) |
| Other family structure | -.26** | (.09) | -.26** | (.10) |
| Other disruptions | | | | |
| Recent transfer | .04 | (.06) | .04 | (.06) |
| Family structure change between waves | -.14† | (.07) | -.14† | (.07) |
| High school size | .00 | (.00) | .00 | (.00) |
| Urban location (ref. = suburban/city fringe) | | | | |
| City | -.20** | (.08) | -.20* | (.08) |
| Town | .08 | (.07) | .08 | (.07) |
| Rural | -.04 | (.10) | -.04 | (.10) |
| Private high school | .02 | (.10) | .02 | (.11) |
| Missing flags | | | | |
| Missing popularity | -.09 | (.05) | -.09 | (.05) |
| Institutional pathway (ref. = stable, uniform) | | | | |
| Stable, mixed | .19** | (.06) | .19*** | (.06) |
| Divergent | .11† | (.06) | .11† | (.06) |
| Middle School GPA | .62*** | (.03) | .62*** | (.03) |
| Middle School affective attachment | | | | |
| Teacher bonding | .07*** | (.02) | .07*** | (.02) |
| Popularity | .02*** | (.00) | .02*** | (.00) |
| Extracurricular involvement | .08* | (.04) | .08* | (.04) |
| Interactions (pathway * middle school GPA) | | | | |
| Stable, mixed * middle school GPA | | | -.07 | (.06) |
| Divergent * middle school GPA | | | -.15*** | (.05) |
| Intercept | -.03 | (.15) | -.03 | (.15) |
| R-square | .49 | | .49 | |

*Note. R*eference categories, where relevant, are in parentheses.
†p<.10. *p<.05. **p<.01. ***p<.001.

Table 4.4 Ordinary Least Squares (OLS) Regression Coefficients and Standard Errors Predicting First Year GPA, by Institutional Pathway (continued on next page)

| | Collective | | | | | | | | Divergent | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stable, uniform | | | | Stable, mixed | | | | | | | |
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Female | .23*** | (.04) | .23*** | (.05) | .24*** | (.05) | .24*** | (.05) | .11* | (.05) | .11* | (.06) |
| Race/ethnicity (ref. = non-Latino white) | | | | | | | | | | | | |
| Asian-American | .16† | (.09) | .15 | (.09) | -.13 | (.15) | -.12 | (.16) | .31* | (.15) | .32* | (.15) |
| Latino/a | -.05 | (.16) | -.05 | (.16) | -.15 | (.13) | -.16 | (.13) | -.14 | (.15) | -.13 | (.16) |
| African-American | -.42*** | (.09) | -.41*** | (.09) | -.40*** | (.10) | -.40*** | (.10) | -.37*** | (.12) | -.37*** | (.12) |
| Other race/ethnicity | -.13 | (.13) | -.13 | (.13) | -.24 | (.15) | -.24 | (.15) | -.02 | (.08) | -.02 | (.08) |
| Parents' level of education | .04** | (.01) | .04** | (.01) | .03*** | (.01) | .03*** | (.01) | .12*** | (.02) | .12*** | (.02) |
| Family structure (ref. = both biological parents) | | | | | | | | | | | | |
| Parent-stepparent | -.10 | (.08) | -.11 | (.08) | -.13* | (.06) | -.13* | (.06) | -.05 | (.09) | -.05 | (.10) |
| Single mother | -.02 | (.06) | -.03 | (.06) | .05 | (.09) | .06 | (.09) | .16† | (.09) | .16† | (.09) |
| Other family structure | -.36* | (.15) | -.37* | (.15) | -.11 | (.14) | -.13 | (.14) | -.27* | (.13) | -.26 | (.13) |
| Other disruptions | | | | | | | | | | | | |
| Recent transfer | -.02 | (.09) | -.02 | (.09) | .31*** | (.11) | .31*** | (.10) | -.08 | (.10) | -.08 | (.10) |
| Family structure change between waves | -.24* | (.12) | -.24* | (.12) | -.09 | (.08) | -.06 | (.08) | -.05 | (.10) | -.04 | (.10) |
| High school size | .00 | (.00) | .00 | (.00) | .00 | (.00) | .00 | (.00) | .00 | (.00) | .00 | (.00) |
| Urban location (ref. = suburban/city fringe) | | | | | | | | | | | | |
| City | -.05 | (.09) | -.05 | (.09) | -.18** | (.08) | -.17* | (.07) | -.27 | (.12) | -.26 | (.12) |
| Town | .12 | (.08) | .12 | (.08) | .20*** | (.06) | .21*** | (.06) | -.16 | (.15) | -.16 | (.15) |
| Rural | -.11 | (.12) | -.11 | (.12) | .20** | (.09) | .22*** | (.08) | .08 | (.15) | .08 | (.15) |
| Private high school | -.12 | (.13) | -.11 | (.14) | -.01 | (.13) | -.03 | (.13) | .15 | (.15) | .15 | (.15) |
| Middle school GPA | .69*** | (.04) | .69*** | (.03) | .67*** | (.05) | .66*** | (.04) | .50*** | (.05) | .50*** | (.05) |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 4.4 Contd. Ordinary Least Squares (OLS) Regression Coefficients and Standard Errors Predicting First Year GPA, by Institutional Pathway

| | Collective | | | | | | | | Divergent | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stable, uniform | | | | Stable, mixed | | | | | | | |
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Teacher bonding | .06 * | (.03) | .07 * | (.03) | .08 † | (.05) | .09 * | (.04) | .06 | (.04) | .06 | (.04) |
| Popularity | .02 *** | (.01) | .02 *** | (.01) | .00 | (.01) | .00 | (.01) | .03 ** | (.01) | .03 ** | (.01) |
| Extracurricular involvement | .09 * | (.04) | .09 † | (.05) | .03 | (.05) | .05 | (.05) | .09 | (.07) | .09 | (.07) |
| Missing flags | | | | | | | | | | | | |
| Missing popularity | -.06 | (.08) | -.06 | (.08) | .03 | (.09) | .03 | (.09) | -.18 * | (.09) | -.17 * | (.09) |
| Social relationships * achievement | | | | | | | | | | | | |
| Teacher bonding * middle school GPA | | | .04 | (.05) | | | .05 | (.06) | | | -.03 | (.07) |
| Popularity * middle school GPA | | | .00 | (.01) | | | .02 ** | (.01) | | | -.01 | (.01) |
| Extracurricular involvement * middle school GPA | | | .06 | (.06) | | | -.20 *** | (.06) | | | .08 | (.08) |
| Intercept | -.02 | (.19) | -.06 | (.21) | .16 | (.25) | .16 | (.22) | .10 | (.27) | .10 | (.26) |
| R-square | .53 | | .53 | | .53 | | .54 | | .47 | | .47 | |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 4.5 Logistic Regression Coefficients and Standard Errors Predicting First Year Math Course Placement Among All Middle School Students

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | *b* | (SE) | *b* | (SE) |
| Female | -.17 † | (.09) | -.17 † | (.09) |
| Race/ethnicity (ref. = non-Latino white) | | | | |
| Asian-American | .52 | (.71) | .56 | (.70) |
| Latino/a | .03 | (.34) | .09 | (.35) |
| African-American | .13 | (.28) | .13 | (.27) |
| Other race/ethnicity | .00 | (.33) | .05 | (.32) |
| Parents' level of education | .06 | (.04) | .06 | (.04) |
| Family structure (ref. = both biological parents) | | | | |
| Parent-stepparent | .01 | (.17) | -.02 | (.18) |
| Single mother | -.17 | (.15) | -.18 | (.15) |
| Other family structure | -.32 | (.25) | -.31 | (.25) |
| Other disruptions | | | | |
| Recent transfer | .70 *** | (.21) | .72 *** | (.21) |
| Family structure change between waves | .01 | (.26) | .03 | (.25) |
| High school size | .00 | (.00) | .00 | (.00) |
| Urban location (ref. = suburban/city fringe) | | | | |
| City | .07 | (.38) | .10 | (.37) |
| Town | -.25 | (.38) | -.25 | (.39) |
| Rural | .13 | (.46) | .13 | (.47) |
| Private high school | 1.09 * | (.50) | 1.10 * | (.48) |
| Missing flags | | | | |
| Missing popularity | -.02 | (.15) | -.03 | (.15) |
| Institutional pathway (ref. = stable, uniform) | | | | |
| Stable, mixed | .00 | (.40) | .06 | (.09) |
| Divergent | .17 | (.27) | .06 | (.03) |
| Middle school GPA | 1.05 *** | (.13) | 1.16 *** | (.13) |
| Middle school affective attachment | | | | |
| Teacher bonding | .00 | (.09) | .00 | (.09) |
| Popularity | .05 * | (.02) | .05 * | (.02) |
| Extracurricular involvement | .63 *** | (.14) | .66 *** | (.16) |
| Interactions | | | | |
| Stable, mixed * middle school GPA | | | -.20 | (.26) |
| Divergent * middle school GPA | | | -.53 * | (.24) |
| Teacher bonding * middle school GPA | | | .20 † | (.10) |
| Popularity * middle school GPA | | | .07 † | (.04) |
| Extracurricular involvement * middle school GPA | | | .35 | (.23) |
| Intercept | -3.19 *** | (.85) | -3.75 *** | (.77) |
| Pseudo R-square | .16 | | .17 | |
| Pseudo log likelihood | -1367.86 | | -1349.02 | |

*Note. R*eference categories, where relevant, are in parentheses.
†p<.10. *p<.05. **p<.01. ***p<.001.

Table 4.6 Logistic Regression Coefficients and Standard Errors Predicting First Year Math Course Placement, by Institutional Pathway (continued on next page)

| | Collective | | | | | | | | Divergent | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stable, uniform | | | | Stable, mixed | | | | | | | |
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Female | -.24 | (.16) | -.24 | (.16) | -.29† | (.17) | -.35* | (.16) | -.07 | (.18) | -.13 | (.19) |
| Race/ethnicity (ref. = non-Latino white) | | | | | | | | | | | | |
| Asian-American | -1.53 | (1.04) | -1.61 | (1.04) | -.26 | (.85) | -.22 | (.87) | 3.39** | (1.09) | 3.45*** | (1.09) |
| Latino/a | -.16 | (.60) | -.19 | (.59) | -1.21† | (.64) | -1.22† | (.64) | .52 | (.45) | .60 | (.50) |
| African-American | -.45 | (.48) | -.39 | (.49) | .04 | (.60) | .12 | (.58) | .30 | (.33) | .29 | (.32) |
| Other race/ethnicity | -.77† | (.40) | -.72† | (.41) | -.06 | (.37) | .02 | (.36) | .58 | (.44) | .63 | (.44) |
| Parents' level of education | .24*** | (.05) | .25*** | (.05) | -.04 | (.08) | -.04 | (.08) | -.06 | (.06) | -.06 | (.06) |
| Family structure (ref. = both biological parents) | | | | | | | | | | | | |
| Parent-stepparent | .20 | (.26) | .15 | (.28) | -.41 | (.32) | -.39 | (.32) | -.09 | (.29) | -.11 | (.30) |
| Single mother | -.04 | (.24) | -.08 | (.24) | -.47† | (.27) | -.49† | (.26) | -.07 | (.25) | -.05 | (.26) |
| Other family structure | -.80 | (.48) | -.82† | (.48) | -.28 | (.61) | -.31 | (.60) | .06 | (.33) | .03 | (.35) |
| Other recent disruptions | | | | | | | | | | | | |
| Recent transfer | .80** | (.31) | .81** | (.31) | .90 | (.57) | .95 | (.60) | .60 | (.36) | .70 | (.39) |
| Family structure change between waves | -.07 | (.33) | -.02 | (.33) | .26 | (.28) | .44 | (.28) | -.08 | (.48) | -.09 | (.49) |
| High school size | .00 | (.00) | .00 | (.00) | .00 | (.00) | .00 | (.00) | .00 | (.00) | .00 | (.00) |
| Urban location (ref. = suburban/city fringe) | | | | | | | | | | | | |
| City | -.27 | (.64) | -.28 | (.64) | .27 | (.48) | .29 | (.47) | -.23 | (.41) | -.23 | (.41) |
| Town | .35 | (.51) | .32 | (.51) | -.39 | (.77) | -.46 | (.81) | -1.04 | (.43) | -1.03* | (.49) |
| Rural | .96 | (.58) | .94 | (.59) | -1.44 | (.66) | -1.41 | (.67) | -.17* | (.58) | -.24 | (.57) |
| Private high school | .80 | (.58) | .83 | (.59) | .73* | (.63) | .75* | (.63) | 1.17 | (.72) | 1.22† | (.73) |
| Middle school GPA | 1.24*** | (.18) | 1.30*** | (.18) | 1.26*** | (.15) | 1.42*** | (.16) | .84*** | (.21) | .95*** | (.22) |

*Note.* Reference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 4.6 Contd. Logistic Regression Coefficients and Standard Errors Predicting First Year Math Course Placement, by Institutional Pathway

| | Collective | | | | | | | | Divergent | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stable, uniform | | | | Stable, mixed | | | | | | | |
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Teacher bonding | .12 | (.16) | .23 | (.15) | -.18 | (.14) | -.12 | (.15) | -.09 | (.14) | -.09 | (.16) |
| Popularity | .07 | (.04) | .07 | (.05) | .03 | (.03) | .08 * | (.03) | .04 | (.04) | .07 | (.05) |
| Extracurricular involvement | .71 *** | (.19) | .77 *** | (.23) | .26 | (.21) | .28 | (.23) | .90 *** | (.22) | .90 *** | (.23) |
| Missing flags | | | | | | | | | | | | |
| Missing popularity | .16 | (.22) | .17 | (.22) | -.14 | (.26) | -.14 | (.27) | -.16 | (.24) | -.24 | (.25) |
| Social relationships * achievement | | | | | | | | | | | | |
| Teacher bonding * middle school GPA | | | .32 * | (.16) | | | .14 | (.20) | | | .17 | (.27) |
| Popularity * middle school GPA | | | .00 | (.06) | | | .14 † | (.07) | | | .12 * | (.06) |
| Extracurricular involvement * middle school GPA | | | .27 | (.34) | | | .40 | (.47) | | | .50 | (.42) |
| Intercept | -5.90 *** | (1.22) | -6.63 *** | (1.17) | -1.27 | (1.12) | -2.23 * | (1.07) | -1.27 | (1.00) | -1.64 | (1.02) |
| Pseudo R-square | .27 | | .27 | | .18 | | .19 | | .15 | | .16 | |
| Pseudo log likelihood | -535.94 | | -532.20 | | -318.86 | | -313.67 | | -425.49 | | -419.58 | |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

# CHAPTER 5: ACADEMIC DIFFICULTIES AMONG COLLECTIVE PATHWAYS: THE ROLE OF SOCIAL OPPORTUNITY

## 5.1 Introduction

In the previous chapter, students' academic performance and placement in the first year of high school varied according to the transitioning pathway, as well as by dimensions of social ties made and broken during this transition. Results from Chapter 4 demonstrate that middle school social ties seem especially salient for students following a collective pathway and both social and academic status play a role in how these social ties affect academic outcomes. This focus on processes of success after a school transition gives a basic picture of how transitions affect students academically. Successful students generally seem to benefit from staying with classmates. But what about unsuccessful students? The transition to high school could be a crucial time that vulnerabilities are exacerbated and the process of failure and drop out is reinforced. Is there any way to protect these students as they transition to high school? Previous research suggests that academically at-risk students are better off when they transition away from middle school classmates (Schiller 1999), yet research has not investigated what happens to low status students who stay with their classmates in the transition to high school. On the one hand, students with low academic achievement in middle school are those who have not acquired the human capital to succeed in school. On the other, research has shown that academically low performers fare better when removing themselves from their previous classmates. This suggests that the persistence of low performance is not purely a function of the meritocratic facets of schooling. This suggests

that low achievement also has something to do with social status and the maintenance or disruption of social ties.

In this chapter, I shift from analyzing processes of success—or even adequate progress—to analyzing processes of failure. Transitions are considered a turning point that may provide opportunities but also may exacerbate vulnerabilities. This chapter explores circumstances where low performing students may be particularly vulnerable during transitions, and investigates whether students with low social status among classmates are more likely to fail courses and have a low math course placement than their classmates, net of prior academic achievement. I focus exclusively on the two collective pathways to high school, where low social status may carry with it an especially salient stigma. Measures of social ties mirror those used in the previous chapter—affective ties with peers and teachers as well as institutional ties such as involvement in extracurricular activities. The two academic outcomes investigated in this chapter provide a picture of minimal academic performance and integration into the new institutional environment of high school. Failing courses indicates a lack of integration into school, lack of skills to meet teacher expectations, and has consequences for students' cumulative academic record and ability to follow a normal progression of required coursework. Math course placement in the first year of high school sets students' academic trajectory (Schneider et al. 1998), which can have lasting consequences on access to postsecondary education (Adelman 1999).

Findings from Chapter 4 point to differences between the two collective pathways concerning ties with peers. In the stable, uniform pathway—one characterized by few

opportunities for new social ties in high school—popular students received higher first year GPAs and normative math placement. However, for adolescents in the stable, mixed pathway—involving stability yet an opportunity for new social ties in high school—having more friends provides a boost in GPA only if students also have a high academic status in middle school.[13] While all students following a mixed collective pathway are more likely to be placed on-track in math, those with high social status have an additional likelihood of starting high school on track to complete math requirements for postsecondary attendance. In other words, only the highest status students in the mixed pathway—those with high academic *and* social status—make a more academically successful transition to high school. I this chapter I more directly compare those differences that emerged in Chapter 4.

Given the differences in social opportunity between the two collective pathways, in this chapter I explore whether the processes of academic failure and low placement differ for students in the uniform or mixed pathways. Social opportunity exists in feeder patterns where, while there may be stability of social ties from the sending school, the receiving high school includes other middle school feeders. Therefore, incoming students have an opportunity to make new friends with classmates coming from other middle schools. In addition, as shown in Table 3.2, students in the mixed collective pathway have more choices available to them of where to attend high school.[14] For these reasons, students in the mixed collective pathway may have more of an opportunity to leave

[13] Because both collective pathways are "stable," I refer to them as mixed and uniform collective pathways in this chapter.
[14] Ancillary analyses for this chapter included a flag for middle schools in districts where sampled students exercise choice. This flag was never statistically significant, nor did it change any of the results presented below.

behind their low status and redefine their academic and social selves within a new institutional context.

**5.2 Hypotheses**

*Hypothesis 1: Students with low affective and institutional ties will be more likely to have low academic outcomes in the first year of high school.* When students' transition to high school following a collective pathway, their social status is likely to be maintained since they enter high school with most of the same middle school classmates. In addition, vertical teaming literature suggests that the practice of teachers' influencing decisions regarding course placement occurs more frequently in districts with more continuity and alignment between levels of schooling (Rutheford and Boehm 2004). But what if a student is socially isolated among their peers? What about students with a reputation of misbehavior and/or low achievement in their classes? As mentioned throughout this study, social ties have been shown to be helpful for academic success, and can even protect against academic failure. Yet students who have low status among teachers and peers may maintain their low status in more stable transitions to high school.

While affective ties gauge students' social status as they transition from middle school to high school, institutional ties such as extracurricular involvement indicate a level of integration into school that may be another avenue for connections with new teachers and the new school administration as well as to other students who are integrated into the school structure. In addition, high school athletic departments often have a "no pass no play" rule, which requires students to maintain a certain GPA to participate. This rule is statewide in some cases and district-wide in others, reflecting increasing pressure

for schools to maintain some connection between academic performance and the ability to participate in extracurricular activities. Low achieving students who are involved in extracurricular activities may receive special attention from school administrators and teachers, and these students may be especially motivated to seek extra help in order to maintain passing grades and participate in activities. Students with low extracurricular involvement, particularly low achieving students, have one less avenue for support when they enter high school.

*Hypothesis 2: Academically and socially low status students with less social opportunity (uniform pathway) will fare worse than those with more opportunity to make new social ties (mixed pathway) in arenas of both achievement and course placement.* When the pathway to high school involves more stability and uniformity both at the sending and receiving school, students travel through school in a more close knit social system. Here, the status quo is likely maintained. This is beneficial for the average or high status student, yet for the socially isolated and academically challenged student, following a collective uniform pathway may exacerbate vulnerabilities (Lee 2000). Therefore, having more social opportunity in high school may provide a place where low status students can find a niche in high school (Kinney 1993). The type of school may also play a role in the mixed pathway. In previous chapters, we see that schools in this pathway are typically larger, more urban, and have more students who can exercise choice than the other collective pathway. Academically low performing students may be able to "shop" for an easier curriculum in such an environment (Powell, Farrar, and Cohen 1985). Therefore, I expect that academically and socially low status students, who

have more opportunity to create new social ties as they enter high school, to be less likely than students from a uniform collective pathway to fail courses and be placed in low math courses.

### 5.3 Sample Characteristics and Analytic Plan

The main analytic sample used for this chapter is middle school students following a collective pathway to high school. Analyses for this chapter take advantage of the large in-school samples of Add Health and constrain analyses to middle school students who follow collective pathways. This includes 1,967 middle school students who transition to 52 high schools.

Table 5.1 shows selected means of measures at each major stage of sample attrition. The first three filters are similar to those utilized in Chapter 4. The largest difference in sample characteristics occurs when filters include only those students following a collective pathway to high school. This sample has a larger proportion of white students who live with both biological parents. Parents' level of education and the proportion of students with a low middle school GPA in the analytic sample are not that different from the entire middle school sample. Differences discussed above are not unexpected given that selecting on students' following a collective pathway to high school disproportionately includes school districts in rural areas and smaller towns, and fewer disruptions such as residential mobility and family structure change. Both factors point to fewer racial/ethnic minority students (Alexander et al. 1996).

Analyses for this chapter establish baseline associations between demographic controls such as race/ethnicity, gender, parents' level of education and family structure.

In addition, other disruptions such as a family structure change between waves or school mobility in the years prior to the transition to high school are also included. A measure of students' low academic achievement in middle school is included, as well as low affective ties and low participation in extracurricular activities. For the academic and social status measures in middle school, "low" is defined as below average. Low academic and social status are defined as such because these students are not necessarily the most socially isolated and/or academically challenged, but certainly are on the social and academic fringes within their transitioning cohort. Therefore, their status could conceivably change after the transition to high school. Preliminary analyses compared various operationalizations of low status such as one standard deviation below the mean and dummies for each of the lower two quartiles. Results are similar to those shown in this chapter. Low popularity is measured as students with fewer than five friends in their school. Low teacher bonding are students who responded lower than average to questions regarding whether teachers treat students fairly, teachers care about them, and whether students get along with their teachers. Finally, low involvement in extracurricular activities for this sample is no involvement. Model 1 also includes students' pathway to high school (ref. = uniform). Other school measures such as those included in Chapter 4 were also investigated but were not statistically significant. The final model adds interactions between following a mixed pathway and measures of low middle school academic performance and social relationships.[15]

[15] Preliminary models also included interactions between low middle school social relationships and low academic performance. These were never statistically significant and are therefore not retained in models presented in this chapter.

## 5.4 Results

Table 5.2 displays weighted descriptive statistics for measures used in multivariate analyses for the analytic sample, and includes separate means for the two collective pathways. The mixed pathway is comprised of a greater proportion of non-white students and has students with a higher average level of parents' education. Students in the mixed pathway report lower levels of academic performance in middle school. There is not a large difference between these two pathways concerning low levels of teacher bonding or extracurricular involvement, but students in the uniform pathway report having fewer friends in their new school more often than those in the mixed pathway.[16]

Results from multivariate models are found in Tables 5.3 and 5.4, which predict course failure and low math course placement in the first year of high school, respectively. I will first discuss Table 5.3. Here we see that students who follow a mixed pathway are less likely to fail a course in the first year of high school than those in the uniform pathway. In addition, students with low affective ties in middle school (both teacher and peer) have a greater likelihood of course failure in the first year of high school.

Model 2 shows interaction terms. Students with low academic performance seem to receive an additional protection against course failure if they follow a mixed collective pathway ($b$ = -.73). This suggests that academically lower status students may benefit

[16] There are a few mean values which are statistically different from the collective mean. T-tests of mean differences indicate that the mixed pathway has more Latinos, students who come from stepfamily households and students who have fewer friends. The mixed pathway has fewer students who fail a course in the first year of high school, fewer white students, and fewer students who are new to their middle school.

from the opportunity to create new social ties in high school compared to those in the uniform collective pathway, which is characterized by almost no opportunity of creating new social ties among peers. Additional analyses reveal that low achieving middle school students who follow a uniform pathway have almost a 50% predicted probability of course failure, compared to a probability of around 30% for academically similar adolescents following a mixed pathway. Therefore, those students who are academically at greater relative risk seem to benefit from having more social opportunity at their receiving high school as they transition from middle school. Other disruptions such as a recent school transfer or family structure change are not associated with course failure in the first year of high school.

Table 5.4 displays results from models predicting low math course placement in the first year of high school. Here, there are no baseline differences among students following the two collective pathways in predicting low math course placement. Students who had better relationships with teachers do not benefit in terms of math course placement. However, those with fewer friends among middle school classmates are more likely to have low math course placement. In addition, institutional ties also seem to play a role; students uninvolved in extracurricular activities are more likely to be placed in lower math courses in high school than their involved classmates.

Following a mixed collective pathway seems to protect students against low math course placement in two circumstances. First, students who have low academic performance in middle school are less likely to be placed in lower levels of math ($b$ = -.67). Analyses of predicted probabilities help interpret this interaction. Students with low

teacher bonding are 10% less likely to be placed in low math if following the mixed pathway—where there is more social opportunity and, perhaps, less vertical teaming. These students may have a reputation among middle school teachers and therefore may benefit from a system where they have more anonymity in high school that is provided for in the mixed collective pathway, with larger schools and multiple middle schools feeding into one high school. The difference in predicted probability of low math course placement for students with average or high levels of teacher bonding is smaller. Here, those following a uniform pathway have the advantage and have a 3% lower predicted probability of being placed in low math. This reinforces that social opportunity is beneficial in terms of course placement for low status students—in this case students who dislike their middle school teachers. Though the predicted advantage among highly bonded students following a uniform pathway is of a lower magnitude (only 3%), this still seems to indicate that more stability is protective against low course placement for the students who are bonded with their middle school teachers.

Second, less popular students in the mixed collective pathway also have a lower likelihood of math placement in pre-Algebra or remedial math ($b$ = -.64). Predicted probabilities for these students reveal a similar pattern as those with low teacher bonding—where students with fewer friends benefit from following a mixed pathway while students with more friends benefit from the uniform pathway. The predicted differences among pathways are not as large for students with fewer friends as they are for those who report lack of bonding with teachers.

Interestingly, students who are recent transfers into their middle school prior to the transition to high school, when following collective pathways, are also less likely to enroll in low level math courses. It may be that new students are processed in such a way that the default placement is more or less "on-track," or possibly that these students' recent transfer is an example of their choosing another school to avoid a lower placement.

Finally, there are some sociodemographic differences in results of the two academic outcomes analyzed in this chapter. Girls fail courses less often than boys during the first year of high school—but findings indicate that girls are also possibly more likely to be placed in lower level math courses ($p<.10$). This amounts to only a 3% difference between boys and girls in the probability of being placed in lower level math, and may be a result of lower placement for girls who have behavioral difficulties in school. Findings for racial and ethnic minorities reveal differences between processes of failure and low course placement. While African-Americans have a greater likelihood of course failure when compared to whites, this is not the case for low math course placement. The opposite is the case for Latino students compared to whites. Students with higher levels of parent education, as expected, are consistently protected against both course failure and low math course placement.

**5.5 Discussion**

This chapter focused on the two collective pathways to high school to explore whether low status students fare better when following a stable pathway that other schools feed into high school—a pattern that involves greater opportunity for new social ties in high school. Findings in this chapter suggest that this is indeed the case.

Results generally support the first hypothesis, that affective and institutional ties are protective against course failure and low math course placement in the first year of high school. For course failure, students who are not close with their teachers and those with few friends amongst their middle school classmates fail courses more often than more popular students. In addition, these two affective ties seem more salient for the failures than for course placement. Recall that students with low teacher bonding respond lower than their classmates to questions regarding whether or not teachers treat them fairly, whether they get along with their teachers, and that teachers care about them. Therefore, these students feel some level of animosity towards their teachers that they may carry with them as they transition to high school. Because there is no significant interaction between teacher bonding and middle school academic performance (results not shown), it seems that this processes works similarly for all students in this sample, regardless of prior levels of achievement. Though teacher reports are not available, it may also be the case that these students' have a reputation as trouble makers that follows them as they make a collective transition to high school. Students with fewer friends are also more likely to fail a course in the first year of high school.

For the second academic outcome, low math course placement, students who are not bonded with teachers do not seem hurt by this. Having fewer friends, however, does seem to factor into low math course placement. Students who are socially isolated are more likely to be placed in pre-Algebra or remedial math upon entering high school. Research has suggested that parental involvement influences course placement after the transition to high school (Baker and Stevenson 1986). Supplemental analyses (not shown)

explored whether students with fewer friends in middle school still have a lower predicted math course placement after controlling for measures of parental involvement available in Add Health; they do. Therefore, it appears that integration into the social milieu of peers in schools may be another facet through which students negotiate their course placement in high school. In addition, students not involved in middle school extracurricular activities are more likely to be placed in a low math class. This institutional disengagement seems to also parlay into a lack of participation in the normal academic trajectory of students, pointing to connections between processes of disengagement in both the academic and extracurricular realms of high school.

The second hypothesis posits that lower social status among students following the uniform pathway will have an additional disadvantage. Students who follow a mixed pathway have lower rates of course failure in the first year of high school than their classmates who follow the uniform institutional pathway. In addition, low achieving students in the mixed pathway have an additional protection against course failure.

Results for low math course placement indicate a slightly different pattern, yet one that is still advantageous in some cases for students following a mixed pathway. There is no baseline difference in low math course placement between students following the two collective pathways. However, students who report low teacher bonding and who have fewer friends amongst classmates benefit from following a mixed pathway in the sense that they are less likely than low status students in the uniform pathway to have low math course placement. This reinforces and clarifies research suggesting that academically low performing students fare better when transitioning away from their

middle school classmates (Schiller 1999). Results from this chapter indicate that low performing students are less likely to fail courses as long as they have an opportunity to create some new social ties in high school—which allows them to also escape some of the negative status associated with low academic performance in middle school.

This chapter illustrates that low social status is related to students' academic performance after the transition to high school, but that an opportunity to create new social ties in high school plays a role in alleviating some of the negative consequences for being socially isolated and institutionally disengaged. There are several instances where students with low status—both academically and socially—benefit from following a pathway characterized by more opportunity to create new social ties upon arriving in high school. This reveals that low social and academic status in middle school are not automatically a prescription for continued failure and isolation, but that students can recover from their low status even when the social system of their middle school is maintained.

In addition, findings on low academic outcomes reveal two important considerations when studying transitions. First, while processes of success are a good place to start when considering the impact of school transitions, processes of failure are also crucial to investigate and may even lead to more meaningful conclusions regarding effects of transitions. Students who fail after a transition should be considered especially vulnerable, and identifying circumstances that failure may be alleviated are a crucial step into promotion of academic persistence and success. Second, differences between the two collective pathways emphasize the importance of taking both the leaving *and* receiving

school into account when studying movement between schools. While social relationships are maintained to a similar degree in both pathways, results indicate that low status does not mean the same thing in these two collective pathways. Lack of involvement, low affective attachment, and academic difficulty appear to have more severe consequences when the pathway between middle school to high school remains more uniform. In this sense, the transition to high school can really be thought of as a filled with possibility and a new beginning for students who follow a mixed pathway. Results underscore not only the importance of social processes within schools, such as affective and institutional ties, as crucial avenues for academic success, but also how the impact of these ties may vary depending on the circumstances of the school change.

Table 5.1 Selected Means and Proportions from Sample Attrition

| | Mean | | | | |
|---|---|---|---|---|---|
| | Sample 1[a] | Sample 2[b] | Sample 3[c] | Sample 4[d] | Analytic Sample[e] |
| Female | .53 | .55 | .55 | .56 | .55 |
| Non-Latino white | .54 | .59 | .59 | .63 | .63 |
| Living with both biological parents | .57 | .58 | .59 | .60 | .60 |
| Parents' level of education | 6.12 | 6.21 | 6.23 | 6.14 | 6.16 |
| Low middle school GPA | | .44 | .43 | .44 | .44 |
| N | 12,167 | 3,147 | 3,044 | 2,000 | 1,967 |

[a]Full Wave III education component with valid transcript sample.
[b]Included filter to Sample 1 for only Wave I middle school students.
[c]Included filter to Sample 2 for having a valid sample weight.
[d]Included filter to Sample 3 for following a collective pathway and schools with network data.
[e]Included filter to Sample 4 for non-missing values on dependent variables.

Table 5.2 Weighted Descriptive Statistics of All Measures Used in Analyses, by Institutional Pathway

| | Collective sample | Stable, uniform | Stable, mixed |
|---|---|---|---|
| Female | .50 | .50 | .48 |
| Race/ethnicity | | | |
| Non-Latino white | .74 | .76 | .69 |
| Asian-American | .03 | .03 | .03 |
| Latino/a | .04 | .02 | .06 |
| African-American | .13 | .13 | .14 |
| Other race/ethnicity | .07 | .06 | .08 |
| Parents' level of education | 6.10 (2.13) | 6.03 (2.16) | 6.24 (2.02) |
| Family structure | | | |
| Both biological parents | .62 | .63 | .60 |
| Parent-stepparent | .15 | .14 | .18 |
| Single mother | .18 | .19 | .17 |
| Other family structure | .05 | .05 | .05 |
| Pathways to high school | | | |
| Stable, uniform | .68 | | |
| Stable, mixed | .34 | | |
| Other disruptions | | | |
| Recent transfer | .10 | .12 | .06 |
| Family structure change between waves | .09 | .09 | .07 |
| Low academic achievement in middle school | .44 | .42 | .47 |
| Low affective attachment | | | |
| Teacher bonding | .45 | .44 | .46 |
| Popularity | .66 | .63 | .73 |
| Low levels of extracurricular involvement | .71 | .71 | .71 |
| Failed a course | .29 | .31 | .25 |
| Placed in lower math course | .30 | .31 | .29 |
| N | 1,967 | 1,230 | 737 |

Table 5.3 Logistic Regression Coefficients and Standard Errors Predicting First Year Course Failure Among Students Following Collective Institutional Pathways

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | *b* | (SE) | *b* | (SE) |
| Stable, mixed pathway (ref. = Stable, uniform) | -.61 ** | (.20) | -.45 * | (.20) |
| Female | -.68 *** | (.13) | -.70 *** | (.13) |
| Race/ethnicity (ref. = non-Latino white) | | | | |
| Asian-American | .17 | (.52) | .16 | (.55) |
| Latino/a | .49 | (.34) | .46 | (.29) |
| African-American | 1.01 *** | (.22) | 1.01 *** | (.22) |
| Other race/ethnicity | .67 | (.39) | .68 | (.40) |
| Parents' level of education | -.11 *** | (.04) | -.12 † | (.04) |
| Family structure (ref. = both biological parents) | | | | |
| Parent-stepparent | .41 * | (.19) | .42 * | (.19) |
| Single mother | .11 | (.18) | .12 | (.18) |
| Other family structure | .47 | (.32) | .50 | (.34) |
| Other disruptions | | | | |
| Recent transfer | -.37 | (.34) | -.38 | (.35) |
| Family structure change between waves | .06 | (.27) | .06 | (.27) |
| Low academic achievement in middle school | 1.67 *** | (.15) | 1.55 *** | (.13) |
| Low affective attachment | | | | |
| Teacher bonding | .38 *** | (.14) | .41 *** | (.15) |
| Popularity | .62 *** | (.14) | .58 *** | (.13) |
| Low levels of extracurricular involvement | .11 | (.17) | .13 | (.19) |
| Stable, mixed * low achievement | | | -.73 *** | (.25) |
| Pathway * social relationship | | | | |
| Stable, mixed * low teacher bonding | | | .15 | (.29) |
| Stable, mixed * low popularity | | | -.19 | (.27) |
| Stable, mixed * low extracurricular involvement | | | .18 | (.36) |
| Intercept | -1.66 *** | (.40) | -1.62 *** | (.41) |
| Pseudo log likelihood | -922.14 | | -917.92 | |
| Pseudo r-square | .22 | | .22 | |

*Note*. Reference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 5.4 Logistic Regression Coefficients and Standard Errors Predicting First Year Low Math Course Placement Among Students Following Collective Institutional Pathways

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | *b* | (SE) | *b* | (SE) |
| Stable, mixed pathway (ref. = Stable, uniform) | -.28 | (.34) | -.17 | (.31) |
| Female | .19 † | (.11) | .19 † | (.11) |
| Race/ethnicity (ref. = non-Latino white) | | | | |
| Asian-American | .02 | (.84) | .07 | (.79) |
| Latino/a | 1.03 * | (.51) | 1.06 * | (.50) |
| African-American | .19 | (.32) | .22 | (.32) |
| Other race/ethnicity | .64 * | (.31) | .64 * | (.31) |
| Parents' level of education | -.15 *** | (.05) | -.15 *** | (.05) |
| Family structure (ref. = both biological parents) | | | | |
| Parent-stepparent | .07 | (.21) | .10 | (.21) |
| Single mother | .23 | (.18) | .21 | (.18) |
| Other family structure | .51 | (.33) | .55 † | (.31) |
| Other disruptions | | | | |
| Recent transfer | -.69 ** | (.24) | -.68 ** | (.24) |
| Family structure change between waves | .04 | (.24) | .01 | (.23) |
| Low academic achievement in middle school | 1.45 *** | (.19) | 1.41 *** | (.19) |
| Low affective attachment | | | | |
| Teacher bonding | .02 | (.15) | -.07 | (.15) |
| Popularity | .39 ** | (.15) | .28 * | (.13) |
| Low levels of extracurricular involvement | .49 ** | (.18) | .50 ** | (.19) |
| Stable, mixed * low achievement | | | -.27 | (.37) |
| Pathway * social relationship | | | | |
| Stable, mixed * low teacher bonding | | | -.67 * | (.29) |
| Stable, mixed * low popularity | | | -.64 ** | (.26) |
| Stable, mixed * low extracurricular involvement | | | -.11 | (.39) |
| Intercept | -1.49 *** | (.39) | -1.39 *** | (.41) |
| Pseudo log likelihood | -1012.89 | | -1004.36 | |
| Pseudo r-square | .16 | | .17 | |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

# CHAPTER 6: PERSISTENCE OF DISADVANTAGE BY THE END OF HIGH SCHOOL AMONG STUDENTS FOLLOWING DIVERGENT PATHWAYS

## 6.1 Introduction

Thus far, this study has focused largely on the transition to high school and established differences among the institutional pathways followed in terms of academic outcomes at the beginning of high school. In Chapter 4, I analyze differences between the three main institutional pathways on academic achievement and course placement in the first year of high school, generally finding distinctions in how social ties are related to academic outcomes between institutional pathway. In Chapter 5, I explore different consequences of following the two collective institutional pathways for students who are vulnerable to low academic performance and disengagement from their middle school.

In this chapter, I shift attention to the two divergent pathways and analyze outcomes at the end of high school. Following a divergent pathway in the transition to high school can carry with it negative consequences, which are accounted for at least in part by the loss of social relationships. Transferring during high school constitutes the most dramatic loss of these social ties, as students not only leave classmates behind but also enter their new high school as one of only a few new students. On the other hand, findings from Chapter 5 illustrate that opportunity to make new social ties at the receiving school can be an important factor for students, especially those who struggle academically and socially in school. In these cases, redefining oneself in a new institutional context can be a fresh start.

In Chapter 4, the main difference between students following divergent pathways and those following collective pathways (see pooled models in Tables 4.3 and 4.5) occurs for higher achieving middle school students; those following a divergent pathway in the transition to high school earn both lower grades in the first year of high school and are more likely to be placed lower in math during that first year. In this chapter, I extend research on these findings by analyzing differences in end of high school academic outcomes between divergent and collective pathways. This will help determine whether any academic effects of following a divergent pathway in the transition to high school persist by the end of high school. Second, analyses for this chapter include analyses with students from the most divergent pathway—those who make a non-structured school change and transfer during high school. By comparing academic outcomes by the end of high school for students in these two divergent pathways, this chapter also indirectly ascertains differences in consequences of diverging according to the structure of schooling. In other words, are transfer students more vulnerable than those who diverge in the transition to high school because their change of schools is non-normative in terms of the structure of schooling?

Specific analyses for this chapter include three basic measures of students' academic progress and success or failure in high school. First, students' cumulative grade point average (GPA) is a basic indicator of successful integration and performance throughout the high school years. Second, as illustrated by Chapter 5, failure may tap into processes not evident when looking at general academic performance. Failure can be considered an important marker for transfer students because changing schools outside

the structured progression of the educational system may be an indication of lack of integration and/or academic difficulty. Finally, level of math course completed by the end of high school predicts postsecondary attendance and, since it is the most sequential of all course curricula, may be particularly relevant for opportunity or vulnerability among transfer students. As with previous chapters, affective attachment and institutional ties are analyzed as an important context within the social system of schools that may affect the impact of a school change.

## 6.2 Hypotheses

*Hypothesis 1: Students following a divergent pathway in the transition to high school will have lower academic outcomes than their counterparts in the collective pathways that persist even by the end of high school.* Social relationships are important factors in promoting integration and success in high school. Results from Chapter 4 indicate that high achieving students have a more difficult time adjusting academically to high school if following a divergent pathway compared to students following the two collective pathways to high school (see Table 4.3). Analyzing math course placement yields similar results, with high achieving students less likely to be placed on-track to complete Algebra II by the end of high school when following a divergent pathway (see Table 4.5).

As mentioned, these findings are not unexpected given previous research. Low achieving students seem better off when transitioning away from middle school classmates (see Schiller 1999). Therefore, it is not such a stretch to expect that high achieving students would have a more difficult time following a divergent pathway. But

research has not explored whether struggles among students' following a divergent pathway to high school persist by the end of high school—or if they can recover. I expect that lower academic placement and achievement in the first year of high school for those following a divergent pathway will translate into continued disadvantage. However, social ties may provide some alleviation of this academic vulnerability.

*Hypothesis 2: The impact of following a divergent pathway on academic outcomes will vary by individual student's prior integration into school, as measured by affective attachment.* Social-psychological research on life transitions has continually stressed the importance of context in how transitions affect individuals (Wheaton 1990; George 1993). I expect that following a divergent pathway through school is no different, and that those less bonded with teachers and/or with lower social status among peers may even benefit from leaving these social ties behind and starting fresh in a new institutional context.

*Hypothesis 3: Extracurricular involvement will promote academic success for students' transitioning to high school, regardless of pathway. However, extracurricular involvement will not promote academic success among transfer students.* In previous chapters, I have hypothesized that institutional ties may more easily convey into a new institutional context in terms of forming social relationships that promote academic achievement. However, I expect the structure of schooling to play a role in this process. Involvement in extracurricular activities is likely beneficial for all students (Eccles, Barber, Stone, and Hunt 2003). When considering students who are changing schools, however, the benefits of extracurricular involvement may only occur when the student is

making a structured school change such as the transition to high school. As mentioned, it is this school change where schools often have programs in place to orient students to the new institutional environment, which may involve advertising opportunities to get involved in extracurricular activities as well as encouragement to become involved.

I expect this to be distinct from a non-structured school change such as a transfer. In these cases, athletic teams and school groups may be well enough established such that integration is more difficult for older students. In the case of a transition to high school, participation occurs at a lower level and therefore may it be easier to become a member of a team/club. In addition, students who transfer into the new high school may not bother to become involved, particularly if the transfer occurs later in high school.

**6.3 Sample Characteristics and Analytic Plan**

There are two main analytic samples used in this chapter: 1) middle school students transitioning to high school (same as Chapter 4); 2) high school students in 9$^{th}$ or 10$^{th}$ grade at Wave I. The older two cohorts of high school students are not included because there is less opportunity for them to transfer during high school and still have variation on their academic outcomes, as well as previous research suggesting that those who transfer later in high school may be somewhat distinct (Swanson and Schneider 1999). In addition, this diminishes the possibility that students will have transferred into their Add Health school prior to Wave I.

Table 6.1 displays selected means of measures at each major stage of sample attrition. Overall, the selected sample means do not differ much from the original sample means for all students with valid transcripts. The final sample constriction of deleting

missing on dependent variables includes removing students without any coursework in the fourth year of high school, which constrains the sample to students who likely do not drop out of high school[17] and eliminates students who graduated early. This may explain the slightly lower first year GPA for the analytic sample compared to the original sample. It is also important to note that by excluding dropouts, analyses for this chapter include only transfer students who likely graduated from high school. Therefore, keep in mind that these transfer students are those who persist, which may be an important distinction concerning academic trajectory and the decision to transfer. The small number of middle school students who later transferred (n = 123) as well as the small number of students who took Algebra II in the first year of high school (n = 53) are also removed from analyses.

Before describing the analytic plan, there are two important elements concerning the sample that must be explained. First, as stated above, a major goal of analyses for this chapter is to compare students who follow the two divergent educational pathways during adolescence—the divergent pathway to high school and high school transfers. This is possible due to the multi-cohort sampling design of Add Health. However, the transitioning pathway followed into high school is not known for cohorts who were already in high school at Wave I. Although a student may not transfer during high school, labeled a "stayer," they could have transitioned to high school by following a divergent pathway. Therefore, it is inappropriate to predict academic outcomes for Wave I middle

[17] Recall that AHAA transcript data was coded for up to six years of high school coursetaking. Therefore, it is possible for students to complete the 4th year of high school and still drop out before graduation, though this is rare.

school cohorts and Wave I high school cohorts together. The divergent pathway in the transition to high school is compared with those following the collective in multivariate analyses, and high school transfers are compared to stayers in separate analyses. This makes it impossible to directly compare divergent pathways, though it is possible to explore patterns of results.

The second issue involves only the analyses for middle school cohorts. In Chapters 4 and 5, the two collective pathways—mixed and uniform—are analyzed as separate groups. In this chapter, the collective pathways are combined as one reference group. This is done largely because the focus of this chapter concerns divergent pathways, and diverging in the transition to high school is distinct from both collective pathways concerning the greater loss of social ties as well as the greater opportunity to create new social ties at the receiving school. However, ancillary analyses with the middle school cohorts tested whether divergent pathways were indeed distinct from both collective pathways and that changing the reference group did not alter results.[18] Regardless of reference category, results for following a divergent pathway—compared to the two collective pathways—did not change. Therefore, while collective pathways seem somewhat distinct from each other (see Chapter 5), they are both different enough from following a divergent pathway so as to be pooled together as a reference group when the focus of analyses is concentrated on the divergent pathway.

[18] Additional analyses conducted included 1) removing stable, mixed from the sample so as to compare divergent pathways with stable, uniform pathways; 2) retaining stable, mixed pathways in analyses but keeping the reference category as stable, uniform. This involved a dummy for stable, mixed as well as testing interactions between prior academic measures/social ties and the stable, mixed pathway; 3) making stable, mixed the reference category with dummies for stable, uniform and divergent in models.

For both the Wave I middle school sample and Wave I high school sample, three academic outcomes are analyzed: overall GPA, course failure in the 4th year of high school, and completion of Algebra II or higher by the end of high school. Including these three outcomes provide an exploration of students' academic trajectory by the end of high school in various academic domains. While findings from overall GPA and course failure are similar, both are retained. The previous two chapters illustrate that processes of academic success and academic failure are somewhat distinct. Specifically, while following a divergent pathway may not promote success, particularly in the case of transfer students, it may protect against failure as shown in previous research (Lee and Burkam 1992). Again, including measures of math course taking by the end of high school captures aspects of students' high school academic careers beyond effort, engagement and adjustment, that of making normal progression towards a degree and taps into the opportunity to learn that is linked to postsecondary attendance.

Models first predict academic outcomes with demographic indicators, other recent disruptions such as a recent residential moves, and academic performance or placement in the first year of high school. Overall GPA is measured cumulatively, so that the first year GPA that controls on prior academic achievement contributes to some of the variation in the outcome. Therefore, a change in GPA is actually being measured from the first year baseline GPA. For failure at the end of high school, it was possible to control on failure of any course in the first year of high school. As shown in results, failing a course in the first year of high school certainly predicts failure at the end of high school, but the year one measure does not contribute to the construction of the outcomes,

as with cumulative GPA. Model 1 includes affective attachment and extracurricular involvement as possible mechanisms promoting academic success. As in previous chapters, models initially included all other measures of disruption. In this chapter, a recent transfer into the Wave I school was never statistically significant in multivariate models and therefore was not included in models presented here. Finally, Model 2 for each of the academic outcomes includes two interaction terms: following a divergent pathway and prior academic achievement, and divergent pathway by prior level of affective attachment and extracurricular involvement. For the high school cohorts, models include an additional control—whether or not the student was suspended from high school prior to Wave I.

**6.4 Results**

Table 6.2 shows weighted descriptive statistics for all measures used in analyses. These statistics are similar to those presented in Chapter 3, except for some sample attrition for reasons noted above and illustrated in Table 6.1, and the inclusion of means for academic controls in the first year of high school and end of high school academic outcomes. As discussed in previous chapters, students following a divergent pathway in the transition to high school report lower levels of affective attachment yet slightly higher rates of extracurricular involvement. In addition, divergent middle school students have a lower average first year GPA than their collective counterparts and have higher average rates of course failure. However, there are no mean level differences in on-track math course placement (e.g., Algebra I or higher) at the beginning of high school. Middle

school students following the collective also have slightly higher means on each of the three academic outcomes.

Mean differences between stayers and transfer students are similar to those found between the pathways of middle school students as well. In general, as shown in Table 6.2, transfer students report lower mean levels of affective attachment and rates of extracurricular involvement, as well as lower academic measures both in the first year of high school and by the end of high school. It is interesting to note that mean differences are already present in the first year of high school, which suggests that disengagement from school may already be present prior to the transfer, and may even be related to the reason for transferring (Roderick 1993). In addition, as mentioned in Chapter 1, other factors related to residential and/or familial instability likely affect both whether or not a student transfers and their academic performance and progress. As a reminder, all social ties and academic controls were measured prior to a change of schools.

I will discuss results predicting overall GPA for both middle school and high school cohorts and then move on to a discussion of course failure and math course taking. In the tables, the label of a divergent pathway refers to both middle school and high school students who follow this institutional pathway. For middle school cohorts, it is students who transition to high school away from middle school classmates. For high school cohorts, divergent pathway indicates transfer students. In Table 6.3-6.5, results for middle school cohorts are shown on the left-hand side of the table and results for high school cohorts are shown on the right-hand side of the table. The only difference between analyses of the two samples is that analyses with high school cohorts include a control for

whether or not students have ever been suspended from high school. This measure is highly correlated with the decision to transfer and is retained in all analyses.

Table 6.3 shows results from models predicting cumulative GPA. For middle school cohorts, students who report higher levels of teacher bonding in middle school earn higher cumulative GPAs than less bonded classmates, net of prior academic achievement in their first year of high school. In addition, students following a divergent pathway and who are bonded with their teachers earn a lower overall GPA, though this result is marginally statistically significant ($b$ = -.06, Model 2).

The second half of Table 6.3 shows results from analyses predicting cumulative GPA for the high school cohorts. Similar to middle school students, high school students who are bonded with teachers earn higher grades by the end of high school. Those involved in extracurricular activities receive a boost in cumulative GPA. While transfer students do not initially appear to have any disadvantage compared to stayers concerning cumulative GPA, in two cases transfer students' disadvantage becomes evident. First, students who transfer and report higher teacher bonding have a lower predicted cumulative GPA than stayers. This is similar to results from the middle school cohorts with those who transition to high school following a divergent pathway. Students who report low teacher bonding and transfer have a predicted cumulative GPA of 2.63 while their counterparts that stay in the same school throughout high school have a predicted cumulative GPA of 2.49. The reverse is the case among those who are highly bonded to their teachers—with transfer students earning a predicted overall GPA of 2.51 and stayers earning a GPA of 2.59. Among students highly involved in extracurricular activities,

transfer students earn a lower cumulative GPA. However, the predicted differences amount to less than a .10 difference in cumulative GPA between groups.

Table 6.4 shows results from models predicting course failure at the end of high school. Here, bonding with teachers is not a statistically significant factor in predicting failures among middle school cohorts. Having more friends amongst classmates and being involved in extracurricular activities does protect against course failure, as these students have a lower likelihood of failure. Similar to results from Table 6.3, however, students following a divergent pathway in the transition to high school who are bonded with their middle school teachers have a greater likelihood of failing a course by the end of high school, even controlling on course failure in the first year of high school. Analyses with predicted probabilities help clarify the meaning of this interaction. Among students with low teacher bonding, those who followed a divergent pathway have an 18% predicted rate of course failure while the predicted rate of failure among students who followed a collective institutional pathway is 8% greater. The reverse occurs among students who report high teacher bonding. Here, students who took a divergent pathway to high school have the highest predicted rate of failure at 29% while those transitioning with the collective have a 21% predicted rate of failure. In other words, increased teacher bonding seems protective against failure only for those who followed the collective institutional pathway to high school. In addition, students less bonded with their middle school teachers seem to benefit from diverging as they transition to high school.

The second half of Table 6.4 shows results from analyses predicting failure at the end of high school among high school cohorts. Results indicate bonding with teachers is

protective against course failure for all students. However, similar to results from cumulative GPA among Wave I high school cohorts (see right-hand side of Table 6.3), students who are bonded with their teachers have a greater likelihood of failure if they transfer during high school. Here, analyses with predicted probabilities reveal that stayers reporting close bonds with teachers fail a course at the end of high school at a predicted rate of 19% while those who transfer and report being close to their teachers have a predicted failure rate of 26%. The difference in failure rate is even more dramatic among those who report low teacher bonding; stayers have twice the predicted failure rate than transfer students (30% vs. 15%). While this is certainly more of a remarkable difference than for cumulative academic achievement, it is important to also note the pseudo r-square predicting failure is quite a bit lower than the r-square for cumulative GPA, likely due to the differences in controls for prior academic achievement/failure. This should be considered when interpreting the differences in magnitude for findings among high school students in Tables 6.3 and 6.4.

Table 6.5 shows results for the final academic outcome analyzed in this chapter—math course attainment. Generally, affective and institutional ties are not predictive of reaching Algebra II or higher by the end of high school in analyses with the middle school cohorts, except a marginal positive association between affective attachment measures and math course taking ($p<.10$). However, students who follow a divergent pathway and begin high school on-track in math are less likely to reach Algebra II than similarly placed students following a collective pathway ($b = -.69$).

Predicted probabilities reveal an advantage to following a divergent pathway for students who are placed in low math upon entering high school. Students who followed the collective pathway are predicted to reach Algebra II at a rate of 26% if they begin high school in pre-Algebra or remedial math and a rate of 80% when they begin high school with Algebra I or Geometry. Among those following the divergent pathway, those starting in pre-Algebra or lower reaching Algebra II at a predicted rate of 34%—9% more often than their counterparts in the collective. Conversely, divergent students taking Algebra I or higher at the beginning of high school and following a divergent pathway are less likely to reach Algebra II (74% vs. 80%). Among middle school cohorts, this indicates that students who are placed more or less on-track at the beginning of high school, transitioning with the collective is beneficial while for students who are low, following a divergent pathway may help them advance in their course sequence by the end of high school.

The second half of Table 6.5 shows results from analyses predicting math course taking of Algebra II or higher by the end of high school for high school cohorts. Students who are close to their teachers are more likely to reach Algebra II or higher in math, net of math course placement in the first year of high school. Among students who begin high school on-track in math (e.g., take Algebra I or Geometry in 9$^{th}$ grade), transfer students have a lower likelihood of reaching Algebra II.

Analyses with predicted probabilities demonstrates that this is largely due to differences among high school students who begin high school in remedial math or pre-Algebra. When students begin high school in lower math courses later transfer to a new

school, they have a 42% predicted probability of reaching Algebra II, while their classmates who stay at the same school only have a 23% predicted probability of reaching that same course. Among students who start high school on-track in math, however, stayers are 6% more likely to take Algebra II than those who later transfer. Therefore, moving away from students' original high school seems to point to resilience among those beginning high school with a lesser opportunity to learn in terms of math course taking.

Finally, transfer students who are highly involved in extracurricular activities have a decreased likelihood of reaching Algebra II ($b$ = -.89). Among stayers, there is not a large predicted difference in reaching Algebra II whether students are involved in extracurricular activities or not. But among transfer students, those with low or only average involvement in activities are predicted to reach Algebra II at a rate of 73% while transfer students who are involved in extracurricular activities only reach Algebra II at a predicted rate of 57% net of math course placement in the first year of high school. This is the one case where being heavily involved in extracurricular activities at the previous school seem to put students at a disadvantage. However, since data limitations do not allow measurement of extracurricular involvement after a transfer, it may be that the discontinuity of involvement is functioning as a hindrance to integration. Either way, transferring seems to interrupt the math course sequence of those heavily involved in extracurricular activities.

Overall, academic outcomes at the end of high school reflect major findings from other studies regarding race/ethnicity, gender and the role of parents' level of education.

Results suggest that females have an advantage in school, particularly concerning academic performance. In addition, students with parents who have higher levels of education also have higher cumulative GPAs, fail courses less often and take Algebra II or higher by the end of high school. Results in this chapter also indicate that race/ethnic minorities—particularly African-Americans and Latinos—struggle more academically in high school. These patterns are generally stronger in models that do not include prior academic performance and course taking.

**6.5 Discussion**

This chapter compared the two divergent pathways in Add Health and AHAA to explore whether transferring is associated with an additional disadvantage, and whether results from following a divergent pathway in the transition to high school persist by the end of high school.

Before addressing results concerning specific hypotheses, I will first discuss results for social relationships among middle school cohorts—which involve an important consideration of survey timing. Interestingly, some of the social relationships measured in middle school do appear to impact end of high school outcomes for all middle school students in expected directions net of the impact on the first year high school outcomes. Students bonded with teachers earn higher cumulative GPAs than those not close to their teachers. Those who are popular among classmates seem protected against failure and have a greater likelihood of taking Algebra II or higher by the end of high school than those with fewer friends. Involvement in extracurricular activities yields similar results as popularity. Due to the sampling design, middle school students do not

respond to survey questions while they are in high school, so students respond to questions regarding affective attachment and extracurricular involvement five to six years before the academic outcome measures. I expect that, if high school measures were available, middle school measures would not necessarily still predict end of high school outcomes, but this remains an empirical question that is not testable with this dataset. Regardless of this measurement difficulty, affective ties and extracurricular involvement do seem to help students as they travel through school.

Overall there is very little evidence to support the first hypothesis. Concerning differences between the collective and divergent pathways in the transition to high school, I expected differences for both types of divergent students to persist by the end of high school. Despite some negative associations between transferring and academic outcomes in preliminary analyses (not shown), neither divergent pathway was directly related to academic outcomes after controlling on where students start academically at the beginning of high school. This may be due to heterogeneity of students who choose to follow a divergent pathway, in the sense that students who change schools may do so because of a residential move or family structure change—or they may be exercising school choice. In addition, this also may be a result of sample constraints. Older transfer students are not included in the final analytic sample have been shown to fare worse after changing schools (Swanson and Schneider 1999), as well as the exclusion of high school dropouts.

However, following a divergent pathway does seem to play a role in students' overall math course taking, after the context of prior academic and social ties are

considered. Part of the impact of following a divergent pathway on students' overall academic trajectory seems to hinge on math course placement in the first year of high school. This is the case in analysis for both the middle school cohorts and high school cohorts. Students who are placed in remedial math or pre-Algebra are *more* likely than other low-placed peers following a collective pathway to reach Algebra II by the end of high school. Previous research has found differences in course mobility between schools (McFarland 2006). This may indicate that students following divergent pathways figure out a way to exercise agency in reaching higher levels of math. Among middle school students who followed a divergent transition to high school, the school may be more amenable to allow fluctuating academic status than the more constrained feeder patterns characterized by collective pathways. For high school students who transfer, this is likely a function of student agency where the transfer may be a strategic move.

There is strong support for the second hypothesis for students following divergent pathways both in the transition to high school and for high school transfers, particularly concerning students' bonds with teachers and how this may impact their academic performance. Students who dislike their teachers at their previous school seem to actually benefit from following a divergent pathway while the reverse is the case for students who are highly bonded to their teachers at the sending high school—net of where the students started high school academically. Students reporting high levels of teacher bonding have more predicted academic difficulty in their new school in terms of performance and course failure. This indicates that following a divergent pathway does not have to be a

negative downward trajectory for students, but can also be an opportunity for students to make a change for the better and find a school where they have more success.

Finally, results support the third hypothesis, and illustrate a key way that following a divergent pathway in the transition to high school differs from transferring during high school. Transfer students seem to have a more difficult time adjusting to their new school in terms of cumulative GPA and overall math course attainment when they are highly involved in extracurricular activities at their previous school. With overall achievement, the predicted difference is minimal. Yet for the academic outcomes of reaching Algebra II, those heavily involved in activities do seem to struggle in their new school. In previous chapters, it has become evident that extracurricular involvement and math course taking are somehow related in the sense that they may tap into a level of integration and following a normal progression through the institution of education.

This chapter illustrates commonalities between students following divergent pathways, which underscores the consequences of disrupting supportive social ties, on the one hand, as well as the opportunity provided when the social ties are less supportive from the perspective of the student, on the other. In addition, results indicate few differences between the divergent pathways. This is somewhat unexpected given that diverging in the transition to high school and transferring schools was hypothesized to carry with it distinct consequences related to the structure of schooling. Because the transition to high school involves all students changing schools, even when students diverge they are still entering a new school among other classmates. On the other hand, a transfer student is likely one of only a few new students at the school. Despite these

theoretical differences, findings from this chapter do not suggest any major differences between these two groups regarding overall academic outcomes, even new of year one academic measures. However, without direct comparison between the groups, further conclusions regarding the role of structure of schooling for those following divergent pathways is not possible.

Results do suggest, however, that those who change schools by following a divergent pathway seem to have more difficulty in multiple academic arenas, particularly if they are average or above average in terms of their previous academic performance and social status among peers and with teachers. However, results also reinforce that the impact of changing schools is somewhat dictated by the context of that change. This appears to be the case particularly for adolescents who are academically marginalized within the school, either in terms of lower freshman year math course placement and less attachment to teachers.

Table 6.1 Selected Means from Sample Attrition

| | Mean | | | | |
|---|---|---|---|---|---|
| | Sample 1[a] | Sample 2[b] | Sample 3[c] | Sample 4[d] | Analytic Sample[e] |
| Female | .53 | .53 | .53 | .53 | .53 |
| Non-Latino white | .54 | .56 | .56 | .56 | .55 |
| Living with both biological parents | .57 | .58 | .58 | .58 | .59 |
| Parents' level of education | 6.12 | 6.12 | 6.12 | 6.08 | 6.15 |
| GPA in first year of high school | 2.59 | 2.57 | 2.58 | 2.56 | 2.62 |
| N | 12,167 | 7,551 | 7,250 | 6,473 | 5,572 |

[a]Full Wave III education component with valid transcript sample.
[b]Included filter to Sample 1 for cohorts of 7th-10th graders in Wave I.
[c]Included filter to Sample 2 for having a valid sample weight.
[d]Included filter to Sample 3 for schools with network data.
[e]Included filter to Sample 4 for year 1 math course lower than Algebra II and non-missing values on dependent variables.

Table 6.2 Weighted Descriptive Statistics of All Measures Used in Analyses, by Institutional Pathway (continued on next page)

| | | Middle School Cohorts | | |
|---|---|---|---|---|
| | Analytic sample | Sample | Collective | Divergent |
| Female | .50 | .49 | .50 | .48 |
| Race/ethnicity | | | | |
| Non-Latino white | .66 | .68 | .74 | .54 |
| Asian-American | .04 | .04 | .03 | .06 |
| Latino/a | .04 | .03 | .02 | .05 |
| African-American | .17 | .16 | .13 | .22 |
| Other race/ethnicity | .09 | .09 | .07 | .14 |
| Parents' level of education | 6.11 (2.19) | 6.13 (2.15) | 6.19 (2.08) | 5.98 (2.30) |
| Family structure | | | | |
| Both biological parents | .59 | .61 | .63 | .56 |
| Parent-stepparent | .16 | .15 | .14 | .15 |
| Single mother | .19 | .20 | .18 | .23 |
| Other family structure | .06 | .05 | .04 | .06 |
| Institutional Pathways | | | | |
| Collective transition to high school | .28 | .70 | | |
| Divergent transition to high school | .12 | .30 | | |
| High school stayers | .55 | | | |
| High school transfers | .05 | | | |
| Other disruptions | | | | |
| Family structure change between waves | .09 | .09 | .08 | .12 |
| Recent residential move | .06 | .05 | .04 | .08 |
| Affective attachment | | | | |
| Teacher bonding | 3.71 (.77) | 3.80 (.80) | 3.83 (.77) | 3.74 (.86) |
| Popularity | 4.90 (3.74) | 4.87 (3.83) | 5.17 (4.02) | 4.18 (3.22) |
| Extracurricular involvement | .47 | .40 | .40 | .42 |
| Year 1 academic measures | | | | |
| GPA in first year of high school | 2.60 (.87) | 2.68 (.83) | 2.71 (.76) | 2.60 (.86) |
| Fail a course in first year of high school | .27 | .25 | .24 | .28 |
| On-track math course placement in year 1 | .67 | .67 | .68 | .67 |
| Academic outcomes | | | | |
| Overall GPA | 2.58 (.80) | 2.64 (.77) | 2.68 (.76) | 2.56 (.79) |
| Fail a course in the last year of high school | .27 | .27 | .26 | .29 |
| Completion of Algebra II or higher | .61 | .61 | .63 | .58 |
| N | 5,572 | 2,218 | 1,589 | 629 |

Table 6.2 Contd. Weighted Descriptive Statistics of All Measures Used in Analyses, by Institutional Pathway

| | High School Cohorts | | | | | |
|---|---|---|---|---|---|---|
| | Sample | | Stayers | | Transfers | |
| Female | .51 | | .51 | | .47 | |
| Race/ethnicity | | | | | | |
| Non-Latino white | .65 | | .66 | | .56 | |
| Asian-American | .04 | | .04 | | .05 | |
| Latino/a | .04 | | .04 | | .05 | |
| African-American | .18 | | .17 | | .20 | |
| Other race/ethnicity | .09 | | .09 | | .14 | |
| Parents' level of education | 6.10 | (2.23) | 6.10 | (2.21) | 6.05 | (2.37) |
| Family structure | | | | | | |
| Both biological parents | .58 | | .59 | | .47 | |
| Parent-stepparent | .16 | | .16 | | .21 | |
| Single mother | .18 | | .18 | | .21 | |
| Other family structure | .07 | | .07 | | .10 | |
| Institutional Pathways | | | | | | |
| High school stayers | .92 | | | | | |
| High school transfers | .08 | | | | | |
| Other disruptions | | | | | | |
| Family structure change between waves | .09 | | .09 | | .13 | |
| Recent residential move | .06 | | .05 | | .15 | |
| Ever suspended from high school | .10 | | .09 | | .12 | |
| Affective attachment | | | | | | |
| Teacher bonding | 3.65 | (.74) | 3.67 | (.74) | 3.51 | (.74) |
| Popularity | 4.92 | (3.67) | 5.02 | (3.73) | 3.79 | (2.70) |
| Extracurricular involvement | .51 | | .51 | | .48 | |
| Year 1 academic measures | | | | | | |
| Year 1 GPA | 2.55 | (.90) | 2.58 | (.89) | 2.23 | (.96) |
| Year 1 course failure | .28 | | .27 | | .35 | |
| Year 1 on-track math course placement | .67 | | .67 | | .58 | |
| Academic outcomes | | | | | | |
| Overall GPA | 2.54 | (.81) | 2.56 | (.81) | 2.33 | (.77) |
| Fail a course in the last year of high school | .27 | | .27 | | .30 | |
| Completion of Algebra II or higher | .61 | | .62 | | .57 | |
| N | 3,354 | | 3,071 | | 283 | |

Table 6.3 Ordinary Least Squares (OLS) Regression Coefficients and Standard Errors Predicting Cumulative GPA for Middle School and High School Cohorts, Respectively (continued on next page)

| | Middle School Cohorts | | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Divergent school change | -.01 | (.03) | -.01 | (.02) | .05 | (.03) | .01 | (.03) |
| Female | .08*** | (.02) | .08*** | (.02) | .11*** | (.02) | .11*** | (.02) |
| Race/ethnicity (ref. = non-Latino white) | | | | | | | | |
| Asian-American | -.04 | (.05) | -.03 | (.05) | .00 | (.04) | .00 | (.04) |
| Latino/a | .05 | (.05) | .06 | (.05) | -.10* | (.05) | -.10* | (.05) |
| African-American | -.04 | (.04) | -.04 | (.04) | -.08* | (.03) | -.08* | (.03) |
| Other race/ethnicity | .02 | (.04) | .02 | (.04) | .01 | (.04) | .00 | (.04) |
| Parents' level of education | .02*** | (.01) | .02*** | (.01) | .02*** | (.00) | .02*** | (.00) |
| Family structure (ref. = both biological parents) | | | | | | | | |
| Parent-stepparent | -.05 | (.04) | -.05 | (.04) | -.01 | (.02) | -.01 | (.02) |
| Single mother | -.01 | (.03) | -.01 | (.03) | -.02 | (.03) | -.02 | (.03) |
| Other family structure | -.14** | (.05) | -.14** | (.05) | -.07* | (.03) | -.07* | (.03) |
| Other disruptions | | | | | | | | |
| Family structure change between waves | .03 | (.04) | .03 | (.04) | -.02 | (.03) | -.02 | (.03) |
| Recent residential move | -.08 | (.05) | -.08 | (.05) | .07* | (.03) | .07* | (.03) |
| Ever suspended from high school | n/a | | n/a | | -.07† | (.04) | -.07† | (.04) |
| N | 2,218 | | | | 3,354 | | | |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 6.3 Contd. Ordinary Least Squares (OLS) Regression Coefficients and Standard Errors Predicting Cumulative GPA for Middle School and High School Cohorts

| | Middle School Cohorts | | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| GPA in first year of high school | .78*** | (.01) | .78*** | (.01) | .75*** | (.02) | .74 | (.02) |
| Affective attachment | | | | | | | | |
| Teacher bonding | .04* | (.02) | .04* | (.02) | .06*** | (.01) | .06*** | (.01) |
| Popularity | .00 | (.00) | .00 | (.00) | .00 | (.00) | .00 | (.00) |
| Extracurricular involvement | .03 | (.02) | .03 | (.02) | .05*** | (.02) | .05** | (.02) |
| Missing flags | | | | | | | | |
| Missing popularity | .07* | (.04) | .07† | (.04) | -.02 | (.04) | -.02 | (.04) |
| Missing extracurricular involvement | -.12** | (.04) | -.11* | (.04) | -.02 | (.05) | -.02 | (.05) |
| Interaction terms | | | | | | | | |
| Divergent * first year GPA | | | -.02 | (.04) | | | -.09 | (.05) |
| Divergent * social relationship | | | | | | | | |
| Divergent * teacher bonding | | | -.06† | (.03) | | | -.10*** | (.03) |
| Divergent * popularity | | | .00 | (.01) | | | .01 | (.01) |
| Divergent * extracurricular involvement | | | -.02 | (.06) | | | -.12* | (.06) |
| Intercept | .25*** | (.09) | .25*** | (.08) | .26*** | (.06) | .25*** | (.06) |
| R-square | .80 | | .80 | | .81 | | .81 | |
| N | 2,218 | | | | 3,354 | | | |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 6.4 Logistic Regression Coefficients and Standard Errors Predicting Course Failure at the End of High School for Middle School and High School Cohorts (continued on the next page)

| | Middle School Cohorts | | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Divergent school change | .00 | (.17) | .04 | (.18) | -.19 | (.22) | -.12 | (.23) |
| Female | -.35 ** | (.14) | -.36 ** | (.14) | -.43 *** | (.13) | -.43 *** | (.13) |
| Race/ethnicity (ref. = non-Latino white) | | | | | | | | |
| Asian-American | .09 | (.34) | .06 | (.34) | -.15 | (.43) | -.16 | (.45) |
| Latino/a | -.01 | (.35) | -.01 | (.35) | .76 * | (.33) | .77 ** | (.32) |
| African-American | .27 | (.21) | .27 | (.20) | .01 | (.25) | .01 | (.26) |
| Other race/ethnicity | -.14 | (.30) | -.14 | (.30) | .45 † | (.26) | .47 † | (.25) |
| Parents' level of education | -.14 *** | (.03) | -.14 *** | (.03) | -.10 *** | (.03) | -.10 *** | (.03) |
| Family structure (ref. = both biological parents) | | | | | | | | |
| Parent-stepparent | .01 | (.23) | .02 | (.23) | .25 | (.20) | .26 | (.19) |
| Single mother | -.01 | (.18) | -.02 | (.18) | .58 *** | (.20) | .59 *** | (.20) |
| Other family structure | .50 | (.35) | .49 | (.35) | .29 | (.22) | .30 | (.21) |
| Other disruptions | | | | | | | | |
| Family structure change between waves | -.09 | (.28) | -.08 | (.28) | .27 | (.25) | .26 | (.26) |
| Recent residential move | .54 † | (.30) | .55 † | (.30) | .11 | (.21) | .12 | (.21) |
| Ever suspended from high school | n/a | | n/a | | .27 | (.19) | .27 | (.19) |
| N | 2,218 | | | | 3,354 | | | |

*Note*. Reference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 6.4 Contd. Logistic Regression Coefficients and Standard Errors Predicting Course Failure at the End of High School for Middle School and High School Cohorts

| | Middle School Cohorts | | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Fail a course in first year of high school | 1.53 *** | (.14) | 1.52 *** | (.14) | 1.49 *** | (.13) | 1.50 *** | (.13) |
| Affective attachment | | | | | | | | |
| Teacher bonding | -.11 | (.09) | -.12 | (.09) | -.35 *** | (.09) | -.34 *** | (.09) |
| Popularity | -.04 * | (.02) | -.04 * | (.02) | -.03 | (.02) | -.04 | (.02) |
| Extracurricular involvement | -.30 * | (.14) | -.30 * | (.14) | -.05 | (.13) | -.05 | (.13) |
| Missing flags | | | | | | | | |
| Missing popularity | -.38 | (.45) | -.36 | (.47) | -.39 | (.42) | -.42 | (.42) |
| Missing extracurricular involvement | .79 † | (.46) | .76 | (.47) | .54 | (.45) | .57 | (.45) |
| Divergent * failure in year 1 | | | .24 | (.29) | | | -.30 | (.44) |
| Divergent * social relationship | | | | | | | | |
| Divergent * teacher bonding | | | .40 * | (.20) | | | .51 * | (.22) |
| Divergent * popularity | | | .04 | (.05) | | | -.06 | (.07) |
| Divergent * extracurricular involvement | | | .19 | (.28) | | | -.38 | (.41) |
| Intercept | .07 | (.50) | .11 | (.48) | .40 | (.45) | .40 | (.45) |
| Pseudo log likelihood | -1095.38 | | -1090.15 | | -1626.40 | | -1622.08 | |
| Pseudo r-square | .15 | | .16 | | .17 | | .17 | |
| N | 2,218 | | | | 3,354 | | | |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 6.5 Logistic Regression Coefficients and Standard Errors Predicting Highest Math Course Taken of Algebra II or Higher for Middle School and High School Cohorts (continued on the next page)

| | Middle School Cohorts | | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| Divergent school change | -.07 | (.21) | -.13 | (.20) | .23 | (.25) | .05 | (.19) |
| Female | .19 | (.13) | .20 | (.13) | .29 * | (.14) | .26 † | (.14) |
| Race/ethnicity (ref. = non-Latino white) | | | | | | | | |
| Asian-American | .27 | (.38) | .37 | (.37) | 1.01 ** | (.33) | 1.03 *** | (.33) |
| Latino/a | .23 | (.36) | .28 | (.36) | -.44 | (.39) | -.43 | (.40) |
| African-American | -.35 * | (.18) | -.34 † | (.18) | .14 | (.29) | .16 | (.29) |
| Other race/ethnicity | -.39 | (.22) | -.37 | (.22) | .09 | (.33) | .07 | (.32) |
| Parents' level of education | .14 *** | (.03) | .14 † | (.03) | .17 *** | (.03) | .17 *** | (.03) |
| Family structure (ref. = both biological parents) | | | | | | | | |
| Parent-stepparent | -.62 ** | (.19) | -.63 ** | (.19) | -.38 * | (.18) | -.37 * | (.18) |
| Single mother | .24 | (.19) | .25 | (.19) | -.30 † | (.18) | -.31 † | (.18) |
| Other family structure | -.47 | (.37) | -.46 | (.37) | -.57 * | (.27) | -.61 * | (.27) |
| Other disruptions | | | | | | | | |
| Family structure change between waves | -.36 † | (.21) | -.35 † | (.20) | .43 | (.31) | .43 | (.30) |
| Recent residential move | -.23 | (.26) | -.22 | (.27) | -.12 | (.29) | -.09 | (.28) |
| Ever suspended from high school | n/a | | n/a | | -1.03 *** | (.24) | -1.05 *** | (.24) |
| N | 2,218 | | | | 3,354 | | | |

*Note. R*eference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

Table 6.5 Contd. Logistic Regression Coefficients and Standard Errors Predicting Highest Math Course Taken of Algebra II or Higher for Middle School and High School Cohorts

| | Middle School Cohorts | | | | High School Cohorts | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | *b* | (SE) | *b* | (SE) | *b* | (SE) | *b* | (SE) |
| On-track math course placement in year 1 | 2.20*** | (.18) | 2.22*** | (.18) | 2.54*** | (.20) | 2.58*** | (.19) |
| Affective attachment | | | | | | | | |
| Teacher bonding | .19 | (.12) | .20† | (.11) | .31*** | (.08) | .32*** | (.08) |
| Popularity | .04* | (.02) | .04† | (.02) | .02 | (.02) | .02 | (.02) |
| Extracurricular involvement | .13 | (.12) | .15 | (.12) | .12 | (.12) | .14 | (.12) |
| Missing flags | | | | | | | | |
| Missing popularity | -.04 | (.38) | -.09 | (.38) | -.13 | (.33) | -.16 | (.32) |
| Missing extracurricular involvement | -.18 | (.40) | -.13 | (.40) | -.30 | (.35) | -.28 | (.34) |
| Divergent * on-track math in year 1 | | | -.69* | (.36) | | | -1.28*** | (.45) |
| Divergent * social relationship | | | | | | | | |
| Divergent * teacher bonding | | | -.25 | (.21) | | | .12 | (.24) |
| Divergent * popularity | | | -.02 | (.06) | | | -.02 | (.07) |
| Divergent * extracurricular involvement | | | -.40 | (.26) | | | -.89** | (.36) |
| Intercept | -2.60*** | (.55) | -2.63*** | (.52) | -3.37*** | (.40) | -3.41*** | (.41) |
| Pseudo log likelihood | -1139.96 | | -1131.72 | | -1527.97 | | -1512.39 | |
| Pseudo r-square | .23 | | .24 | | .31 | | .32 | |
| N | 2,218 | | | | 3,354 | | | |

*Note*. Reference categories, where relevant, are in parentheses. †p<.10. *p<.05. **p<.01. ***p<.001.

# CHAPTER 7: DISCUSSION

## 7.1 Introduction

The purpose of this study is to investigate the institutional pathways that students take as they travel through the system of education and explore how differences between and within pathways affect students' academic trajectory. By investigating the point of the students' changing schools, this research provides a window of insight into the centrality of the maintenance and reconfiguration of social relationships and how this is connected to students' educational trajectory. This study is the first of its kind to consider school transitions as institutional pathways in such depth, and reveals that research should be cautioned against treatment of students' responses to changing school as a monolithic experience.

## 7.2 Main findings

In Chapter 3 and with the bivariate descriptive statistics in each subsequent chapter, distinct social and educational realities become evident for students following the different institutional pathways. Students following the collective, and those who do not transfer during high school, are those that travel more or less normatively through school. They transition to high school with classmates and/or they remain at the same school during their high school career. These students have average or above average grade point averages and they are generally placed on-track in math. In addition, these students' levels of social relationships reflect their stability as they move through the school system. They are simply more integrated into their schools.

Students following divergent pathways have additional characteristics that reflect disruption—with higher than average occurrences of family structure change and residential mobility. In addition, there is some evidence in bivariate results that these students are simply *less* integrated both academically and socially into their schools.

As hypothesized and suggested by previous research, affective attachment and extracurricular involvement not only predict higher academic outcomes within schools—they also play a role in students' adjustment to the new institution after a school change. As shown in Chapter 4, both institutional and affective ties predict successful academic adjustment in high school for the most stable collective transition—stable, uniform. Social ties seem less salient for pathways with more disruption, though affective attachment still does promote academic success. In addition, affective ties seem to help students with academic performance after the transition to high school, while extracurricular involvement seems more linked to adequate or "on-track" math course placement. Here, involvement in extracurricular activities appears reflective of engagement in the institution of education in such a way that those who are engaged academically are the same students who are engaged in other aspects of their high school.

In analyses restricted to high school cohorts, students who are more bonded with teachers receive an expected boost in academic outcomes—either protecting against failure or promoting higher academic performance or math course taking. This is consistent with previous research that posits teachers as crucial links between schools and students as "institutional agents" (Stanton-Salazar and Dornbusch 1995). While social relationship measures may seem less salient for high school students in predicting end of

high school outcomes, this is likely due at least in part to the ability to model analysis in such a way as to control on highly predictive first year academic measures.

Interestingly, results indicate few direct relations between any single institutional pathway in multivariate models on academic outcomes. Students following the stable, mixed pathway earn better grades in the first year of high school compared with those in other pathways. The combination of stability of social ties from middle school and opportunity to create new social relationships and possibly broader academic opportunities upon entering high school seem beneficial for all students in this pathway. Findings from Chapter 5 certainly suggest this is the case.

While direct relations between students' institutional pathway and the academic outcomes in pooled models are not always initially evident, these pathways still provide important theoretical and empirical contexts for which to understand processes of transitions. Findings reinforce life course research on transitions that the impact of transitions is highly linked to the context with which they occur. Findings from this study suggest that levels of integration into school, measured as affective attachment and extracurricular involvement, are related to academic outcomes after a school change. For the transition to high school, social status among peers is beneficial in the most stable transition, but only students with the highest levels of academic *and* social status receive an added boost in academic performance after the transition to high school among students following the mixed pathway. Students who rise to the top because of academic talent and those who are well-liked among peers are likely to be successful in any institutional pathway.

Conversely, students who have low academic and social status amongst their peers benefit from an opportunity to create new social ties in high school. Transfer and divergent students who dislike their teachers seem better off in terms of academic progress by removing themselves from their current trajectory and entering a new school. Students highly bonded with their teachers seem to falter when in the same situation—as do transfer students who are heavily involved in extracurricular activities, though involvement in the receiving school is not known.

Taken together, a tension emerges concerning the role of affective attachment and institutional involvement on students' academic trajectory after school transitions. On the one hand, integration into school predicts academic outcomes even after a school change. Social ties at the school prior to a school transition consistently appear to impact students' academic trajectory as they enter a new school. This suggests that integration into school is a pattern of behavior for an individual that does not seem dependent on the particular school attended. For example, if a student generally likes school, gets along well with teachers, and makes friends easily, she will likely feel the same way about school no matter what school she attends.

On the other hand, this dissertation provides evidence that students interact with the social system that is characterized by their schools in distinct ways. This becomes evident for students who can be considered somewhat at the extremes either academically, socially, or both. For example, students who excel academically appear to receive more benefits from social ties. High performing students who also form closer bonds with teachers, have more friends among peers and are more involved in

extracurricular activities are more likely to earn higher GPAs and are poised to complete Algebra II by the end of high school at higher rates. This is also evident when the focus is turned towards students who are academically and socially isolated in their school, with these students predicted to fail courses and lag behind in the math course sequence in high school.

Specifically, results indicate that there are some situations where breaking social ties by leaving one school and entering a new school—even if this is done outside the structure of schooling such as a transfer—can positively influence students' overall educational trajectory in high school. This is also evident for students who have more social opportunity as they transition to high school. Taken together, these findings point to some important implications.

### 7.3 Implications

Overall, results reiterate the importance of integration into schools for academic achievement and even math course taking. Both types of social ties analyzed were significant predictors of students' educational trajectory even after early achievement and placement were considered, which underscores the importance of schools being proactive in keeping their students engaged and integrated. This can be done through teachers and other school administrators providing mentorship, the promotion of positive peer interactions, and encouraging students to participate in extracurricular activities. Much of the results in this study point to some generalized benefits of social ties. However, these ties seem much more important for students who are either struggling academically or are socially isolated. In these cases, forming social relationships within

the context of their school appear to be a key ingredient that is shown in this study to promote higher academic outcomes and exacerbate vulnerability to failure and lower course placement. Those who are already disengaged in middle school should be most sought after by schools in terms of promoting important affective social ties as well as extracurricular involvement.

Findings also indirectly speak to debates concerning school choice. Descriptive statistics illustrate that there are certainly differences in the chance to attend magnet schools and/or private schools for the institutional pathways followed. However, there are relatively few of these specialized schools in this study and there is no statistical association in of these measures in multivariate models. Yet broader issues of choice are certainly relevant, particularly in cases where a student may be vulnerable. This is perhaps most evident in Chapter 5, which compares the two collective pathways. Students who have a choice of where to attend high school rather than moving through a one feeder school/one high school system seem to fare better overall. This is likely due in part to social opportunity, as discussed in Chapter 5. This is also likely due to some unmeasured facet of attending school in these districts, that the choice of where to attend high school can be a powerful resource for students who are more marginalized within the school system.

Finally, some of the findings of this dissertation should be of interest to parents. There is so much information given to parents that making a non-structured school change such as a transfer is irreversibly damaging to their child's educational trajectory. This may generally be the case, particularly making multiple transfers. However, I would

argue that transferring or transitioning to high school following a more divergent pathway are not necessarily harmful to students' educational trajectory. In other words, effects of changing schools really do depend on the context with which they occur. If students are unhappy at their school—research from this dissertation supports the notion that removing students from an environment where they are unhappy or low performing not only does not hurt students' overall trajectory, but rather it can help them make a fresh start and even sometimes end up better off for changing schools. This would support school choice initiatives, where parents can remove a child from a school where they are socially and/or academically disengaged.

### 7.4 Limitations

As with any study, limitations must be considered in the interpretation of results. The most important limitation of this study surrounds issues of selection, particularly concerning effects of following divergent pathways. A number of additional unmeasured factors could influence students' choice to follow a certain pathway as they move between schools in the transition to high school or transfer during high school. Although this study controlled for residential mobility, changes in family structure and recent transfers, the timing of these measures are somewhat problematic since they come from Wave I survey data. It is likely this reason that other disruptions did not have more predictive power of academic outcomes in multivariate models. In addition, unmeasured risk factors might come into play or interact to precipitate a spiral of cumulative stress for students. Previous research has shown that cumulative stress affects adolescents distinctly from those undergoing a single transition (Simmons et al. 1987). Although my

exploratory analysis indicated no such evidence, the Add Health is limited in measurement of these risk factors.

Similarly, the reasons why students transition to high school along a certain pathway are not known. Individual agency and preexisting circumstances could also play key roles, particularly for students following divergent transitions. In these cases, students who are more likely to choose these pathways could also be predisposed to do worse in school. Although the multivariate models included many controls related to their prior circumstances, unmeasured factors no doubt remain, particularly for students who chose pathways with few classmates. Supplemental research conducted with the National Educational Longitudinal Study (NELS) predicting that students follow a solitary pathway to high school demonstrate the difficulty of predicting divergent pathways in the transition to high school. NELS includes rich measures of school choice that may predict a solitary transition. However, models predicting this type of transition only explained around 10% of the variance. Analyses predicting transfer has been more fruitful, with measures tapping behavioral difficulty at students' current school strong predictors of whether or not a transfer occurs, such as participation in at-risk behaviors. Measures that have shown to significantly predict a school change were included in ancillary analyses to explore whether associations for high school cohorts found in Tables 6.3-6.5 are explained by these factors. They were not. Regardless, future research should prioritize investigating students' propensities to make less normative transitions.

## 7.5 Future Directions

This study establishes some fundamental patterns of how school change is related to academic outcomes during adolescence. Findings also highlight three areas of future research on school transitions that would further empirical knowledge.

At the most basic level, findings highlight potential gender differences and risks of transitions for certain sociodemographic populations. Transitions have been found to affect girls and boys differently (Simmons and Blyth 1987), particularly in the area of social relationships (Wigfield et al. 1991). Preliminary research included interactions between gender and social relationships for each of the chapters. Particularly in the transition to high school, some of these analyses suggest that girls have a more difficult time following a divergent pathway. Research also indicates differences between boys' and girls' social relationships on math course taking outcomes as well (Riegle-Crumb 2006). While these types of analyses are outside the scope of this dissertation, future research should examine whether different processes for boys and girls occur within each institutional pathway.

Similarly, African-Americans seem consistently disadvantaged during school transitions compared with whites, whereas other racial and ethnic minority groups appear to be more successful when following certain institutional pathways. These initial patterns warrant future research. As with certain transfer students, those who are traditionally more isolated within the institution of education may benefit from changing schools in certain circumstances—and have detrimental consequences in other circumstances.

Second, as mentioned above, selection into school transitions is an issue. Future research should begin to utilize innovative statistical techniques such as propensity score matching to directly address selection bias of school change. This method would be particularly relevant for transfer students; they make a non-normative school change and, as results suggest, have mixed results in terms of the benefits of this school change that depend in part by the context with which the change occurs. For example, statistically pairing students who transfer due to risk factors such as problem behavior or drug/alcohol use with similar students who stay at the same school can help isolate consequences/benefits of transferring.

Another way that selection may be addressed in future research is to replicate analyses with other nationally representative education data sets. Results are generally consistent with previous research on school transitions (Schiller 1999) and school transfers (Swanson and Schneider 1999) using NELS, but more verification of findings is possible using these data. Specifically, NELS has excellent measures of school choice and only one cohort of students. Analyses could therefore investigate effects of institutional pathways among students in districts with choice and compare them to more "collective" districts, or those with little or no choice.

Finally, research on students following the collective transition to high school can be expanded in future investigations by exploiting the study design of Add Health to investigate the high school social climate. Add Health is an excellent data set for analyzing school level effects with Hierarchical Linear Modeling (HLM) techniques, where the high school social climate may impact students' transition to high school.

Measures such as school and teacher attachment, social acceptance of students, truancy and violence in schools provide insight into the social climate of the high schools. What is it like to attend this school? Do students respect their teachers? Who is socially accepted? Are there social opportunities and a normative culture of student involvement in school activities? All of these factors likely shape students' adjustment to their new school, which in turn may mediate academic success or failure.

Processes of success and failure likely differ according to the high school climate. For example, school size may play a role in course offerings and therefore indirectly affect course failure and even placement.[19] Furthermore, informal processes in the school should also be explored as possibly mediating associations between student characteristics and academic outcomes in the first year of high school. Does the school have a culture of underperformance? What is the proportion of students who are placed in lower levels of math upon entering high school? These aspects of the school point to some measure of academic press and scarcity of resources. In addition, the density of social networks at the school may indicate a more closed social system that is less favorable for the integration of incoming students. These facets of the high school climate should be investigated in future research.

### 7.6 Conclusions

School transitions during adolescence mark a turning point in individuals' life trajectories and they are the last compulsory movement between institutions of education

[19] Ancillary research did investigate some basic school level measures in STATA such as school size, urban location, density of friendship networks, truancy, mobility and social status of high achieving students at the high school. These were not statistically significant and did not function as mediators.

for individuals in American society. The evidence from this study and others that not all students experience school transitions in the same way should be seen as an opportunity for researchers to further understand processes of stratification occurring in the institution of education as well as ways to prevent it. Importantly, this dissertation illustrates that variation in the impact of school transitions stems not only from individual reactions to the transition, but also the institutional context and students' embeddedness within that context. Broadening our understanding of disruption by considering school transitions as the movement between institution is necessary to further recognize the array of mechanisms involved in crucial institutional transitions in the midst of adolescent development—and how they affect students' academic trajectory in high school and later in the transition to adulthood.

## Appendix

There were four main steps in the construction of the measure of middle school students' contribution to their transitioning high school class. This was done separately for each of the three middle school cohorts (7th, 8th and 9th grade middle school students in Wave I). Subscript notation for the equations denotes individual student ( $i$ ), middle school ( $j$ ) and high school ( $k$ ).

$r$ = Add Health individual In-School survey weight
$t$ = AHAA individual education component weight
$S$ = AHAA school weight
$g$ = Transition group weight
$c_1$ = Size of sampled middle school class
$c_2$ = Size of incoming high school class taken from the CCD/PSS[20]
$p$ = Transition groups' contribution to the incoming high school class

I. Using the In-School survey, which targeted a census within schools and includes a individual weight adjusting for survey non-response, along with the AHAA school weight, the following equation gives the student weight for non-response for each $_{ij}$:

$$r_{ij} = \bar{r}_j / S_j$$

The sum of this weight within schools yields the number of students corrected for non-response as follows:

$$R_j = \sum_{i=1}^{n_j} r_{ij}$$

II. Using AHAA education component weight, the following equation gives a student's weight within their school.

$$t_{ij} = \sum_{i=1}^{n_j} t_{ij} / t_j$$

III. Using weights developed in steps I and II, along with the subsets of students' transitioning together, are used to construct a weighted transition group by:

$$g_{ijk} = \sum_{i=1}^{n_{jk}} t_{ijk} * (R_j / c_1)$$

IV. Finally, this yields the middle school transition group's contribution to the incoming high school class as follows:

$$p_{ijk} = g_{ijk} / c_2$$

[20] CCD/PSS refers to the Common Core Data, a census of American public schools and the Private School Survey, a census of American private schools. More information can be found at http://nces.ed.gov/ccd/ and http://nces.ed.gov/surveys/pss/, respectively.

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## VITA

Amy Gill Langenkamp was born to parents Jim and Vida Langenkamp in San Diego, California on January 29, 1975. After completing her work at Shorewood High School in Milwaukee, Wisconsin in 1993, she attended Villanova University. She received the degree of Bachelor of Arts in Sociology and Spanish in May 1997. During the next two years she worked as an elementary school teacher and led backcountry camping trips for adolescents. In August 1999 she entered the Graduate School of The University of Texas at Austin where she received her Master of Arts in December 2001.

Permanent Address: 5010 Avenue F., Austin, Texas 78751

This dissertation was typed by the author.